JUNE
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PESTS

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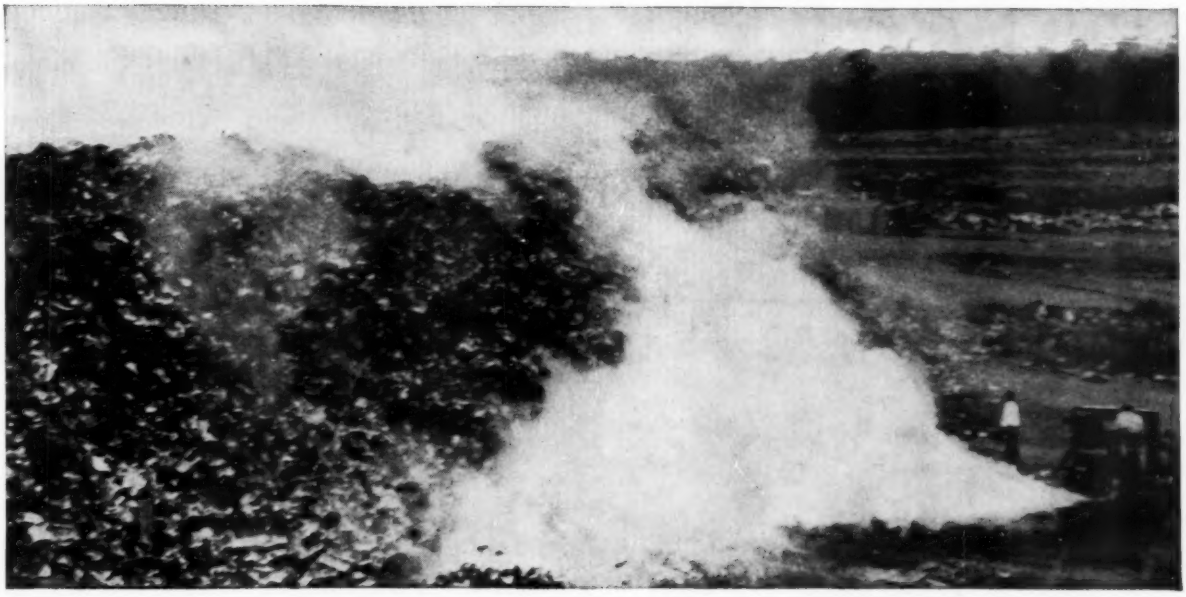

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PESTS and their CONTROL

JAMES A. NELSON
Editor

Cooperating with

NATIONAL PEST CONTROL ASSOCIATION

Contributed articles in this publication do not necessarily reflect the opinions of the editors. The editors invite discussions, comments and all types of material pertaining to pest control and pests from those interested in the advancement of the field.

All contributions must be in our hands by the 15th of the month preceding issue for which they are intended.

EDITORIAL and BUSINESS OFFICES

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Cleveland 15, Ohio

JUNE, 1948 **Vol. 16, No. 6**

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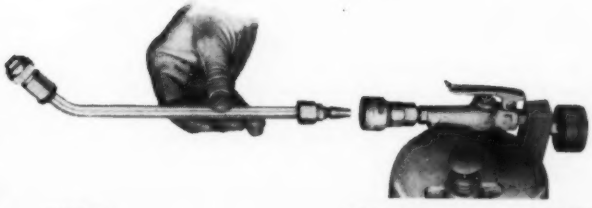

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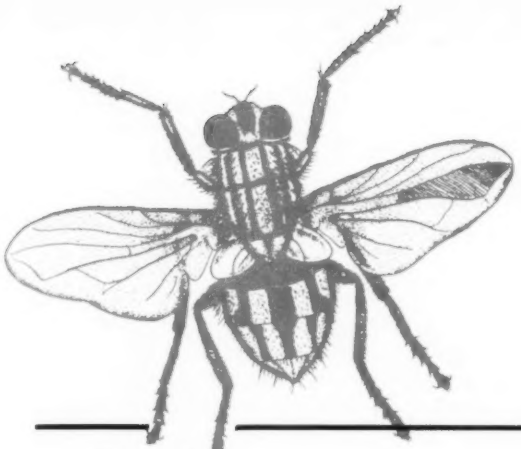


The Housefly

Know the FLIES... to Control Them

BY DR. F. O. MORRISON

MacDonald College of McGill University, Montreal, Quebec, Canada

Editor's Note: Flies have been designated the "bug of the year" at both the Purdue Conference and at the one held earlier this year in Canada. Believing the control of flies can be more effective when their habits are known, the results of Dr. Morrison's prolonged study into the behavior of fly species presented at the Montrel PCO Conference are given here. This report is particularly timely when the country is being made fly-control conscious through the efforts of local, state and national drives.

- Blue Bottle and Green Bottle Flies
- Cluster Fly
- Lesser Housefly
- Pomace Flies
- The Housefly

LIFE HISTORY OF A FLY

A. Egg

In general all fly eggs are laid on or near suitable larval food, though a few species may retain their eggs until they hatch and thus give birth to living young. Some rare species produce full grown living young which pupate at once.

B. Larva

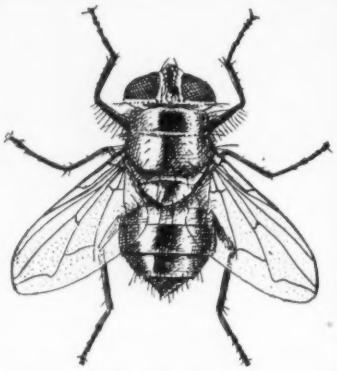
The larvae of all the muscoid flies are known as maggots. They have no real heads but just scrapers of mouth hooks. Digestion is at least in part, external to the body. The food is scratched and macerated with the mouth hooks, liquefied by enzymes, which are poured out in the saliva (spit), and then sucked back in. The larvae live in the liquid mass of partially digested food, with their tail-end breathing tubes occasionally exposed. They can stand very little drying out. This is an important point to consider when applying controls or preventative measures. Most forms moult three times. At high temperatures development is rapid requiring only a few days, but lower temperatures may greatly prolong this period. All growth takes place during the larval stages, none occurring after adulthood is reached.

C. Pupa

The ful-fed larva leaves the food mass and seeks drier quarters. Migration of these legless creatures may be over several feet of ground even up to 150 feet. Too much moisture or too little inhibits pupation. The lost larval skin shrinks, becomes capsule-like, and darkens in color. Inside the pupa forms and draws away from the old skin or "puparium," being connected only by two breathing tubes to the outside. The pupa does not feed or move. It is encased in the hardened puparium and is generally the most resistant stage — often it is the overwintering stage.

D. The Adult

The adult becomes fully formed inside the puparium. It escapes by literally blowing the lid off the capsule. Empty "capsules" with lids blown off are common. To do this the fly contracts its body muscles, a flap lifts up above its feelers and out comes a ballon, "Ptilinium," which can be alternately inflated and deflated, and by its hydraulic pressures, lifts the lid and also forces other debris out of the way. The fly can thus work its way up through several inches of soil. Once in the open air the ballon is withdrawn, never to be used again, faecal matter may be expelled, and the wings, still wrinkled up sacs, are expanded by blood pressure and held up to dry. This must be done after crawling up onto some elevated surface, straw, wall, etc. After a



Blue Bottle Fly

brief period the wings are dry, the body darkens in color and the adult is ready for action. Males and females may mate after a period of hours, days or weeks depending on the species. Then egg laying again begins.

Flies from puparia emerge full grown. Little ones can never grow into big ones. All growth as previous stated occurs during the maggot stage. Nevertheless most adult flies must feed in order to live and some need certain foods specifically for egg development.

Foods must be in solution or fine suspension, but need not be liquids as the fly is always prepared to spit on soluble solids and then imbide the food that dissolves in the spittle. If spitting isn't adequate a little liquid food can be regurgitated. Nor is spitting confined to food, all surfaces must be tested to see if they are suitable food. Hence all the light colored vomit spots left by flies on walls, windows, etc. It takes little imagination to consider what remnants of previous meals are washed out of the mouth with the spit, or occur in the vomit a fly leaves on your bread or sugar loaf as it explores it in a restaurant. It has been said that one should exert his will and allow the feeding fly to complete his meal so that at least most of the material he spewed out will be re-imbibed.

In general temperature, and odors, attract flies to shelter, food and egg laying sites.

SIMILARITIES and DIFFERENCES

Between the Life Histories of Common Species

BLUE BOTTLE and GREEN BOTTLE FLIES[1]

Calliphora. Lucilia, Phormia, etc.

Egg laying sites — Blue bottle and green bottle flies lay eggs on meat; dead animals and birds (large and small); fish; decomposing proteins or fats; around wounds on living animals, especially if tissue is decomposing around the wound: in some geographical areas some species lay on wool near the anus of living sheep, where it is soiled with excrement and urine. Eggs have been found in cream in bottles and cans. The female is stimulated to oviposit by a combination of odors of decomposition, i. e., skatol, sulfur compounds and ammonium carbonate, etc. Adults visit garbage regularly but probably only lay eggs if there is meat or fish present. The presence of adult flies in such cans is not evidence of breeding there. Dead animals are the chief oviposition grounds in nature. Dead mice, dead nestling birds, offal around slaughter houses, etc., are utilized. The eggs hatch at 68° F and 70% R.H. in about 11 hours. They stand very little holding back at low temperatures, but some species may hatch after 4 to 7 days.

Larval food. The larvae feed almost exclusively on decomposing flesh. They enter the meat as a solid rank or cluster . . . stragglers die . . . only a group can excrete enough ammonia to activate the trypsin (enzyme) which they pour out. These flies are possible in a state of active evolution of feeding habits. It is not a far cry from feeding on dead and decomposed meat to parasitism on live flesh, as is practised by closely related flies. *Calliphora* and *Lucilia* spp. in Canada are almost entirely carrier feeders, however, they turn up as secondary occupants of wounds on sheep (shearing, castration wounds, etc.) after the wounds are infested (in the south) with the closely related screwworm fly *Cochliomyia. Cochliomyia americana* is not found under natural conditions except in wounds. In Europe and in Australia certain *Calliphora* and *Lucilia* species are called "wool maggots." They lay on soiled wool about the sheep's buttocks. The larvae later attack the living flesh and create sores. It is stated that in Australia this habit has developed within the memory of man. Our common species may also lay eggs in soiled wool but most infested wounds are considered to be wounds that have become infested and not generally due to the larvae attacking uninjured skin.

There are several known cases of larvae of these genera being taken from wounds in humans (causing Myiasis) but no records of the intact skin being invaded. Other genera (*Wohfahrtia*) will penetrate the intact skin of humans and animals, and there seem possibilities of the common genera evolving such habits as they have where sheep are concerned in Australia. Some workers report larvae from the human intestinal tract causing intestinal myiasis. Many reported cases are due to contamination of stools before examination. It is doubtful if the larvae could live in a normal gut.

Dr. Baer during the war of 1914-1918 observed that soldiers whose deep wounds were infested did not develop the bone disease, Osteomyelitis. On his return he investigated the work further and for years "maggot therapy," (introducing sterile laboratory reared maggots into Osteomyelitis lesions) was standard medical practice. The larvae massaged the area consumed in dead flesh, and sterilized the wound with their excretions—healing followed. The maggots did not attack the living flesh. With the discovery that

the chemical "allantoin," readily prepared from the urea in urine, was the chief healing agent produced by the maggots — man's natural antipathy for maggots resulted in chemical treatment replacing maggot therapy. The patient could see the maggots. He does not connect allantoin with urine.

Given sufficient moisture 10 grams (less than ½ ounce) of lean beef will adequately feed 67 larvae. Take note how many larvae a dead mouse might support.

At 80° larvae leave the food in 4½ days or less, enter the soil and in a day or two become pupae. Larvae will stand low temperature (50°F) for a week or more. Their development is thus greatly prolonged. At 40° they are inactive and soon attacked by bateria.

Pupal location and duration — The pupae occur in soil under carcases, etc. At 80°F this stage lasts about 7½ days. Temperatures of 45° or so are withstood by prepupae for long periods, i.e., in one case up to 5 months, but 41°F readily kills pupae of some cultures in a week. Nevertheless pupae occur in the soil under carcasses and in such places as bird boxes (martin boxes) during the winter months. There seems to be no real record whether they live all winter or not in these locations.

Number of generations — A generation may take from 9 to 100 days or more. It seems likely that 2 to 10 generations a year may occur here. Species vary somewhat.

Wintering Stage — As far as is known wintering is in the pupal stage in soil or other shelter such as martin boxes. Some species probably overwinter as adults. Dormant adults under boards and woodpiles, etc., become active with warmth but still they lay eggs? At least one case of egg laying in a wound or sore on a human's nose is recorded for December in Alberta.

Wintering quarters — soil or other shelter.

Attractants for adults — odors of putrefaction, e.g., skatol, butyric acid, etc.

Unusual Habits — Adults need fish or liver (protein) food to develop eggs, and sugar to prolong life. The varied oviposition sites referred to above, and the tendency to congregate on sunny walls and banks are noticeable.

Table of Figures for Generations of Blue & Green Bottle Flies from Texas

Species	Preovip. Period	Egg	Larva	Pupa	Totals
Lucilia sericata	5-9 days	1-7 days	3-9 days	3-13	9-21
Lucilia caesar	6-26 days	1 day	3-12 days	5-16	16-79
Phormia regina	7-18 days	1-4 days	4-15 days	3-13	10-25
Calliphora erythrocephala	12-27 days	1 day	3-4 days	7-9	15-20
Cyanomia cadaverina	7-21 days	1-2 days	3-5 days	6-58	13-90

CLUSTER FLY[2]

(*Pollenia rudis*)

Egg laying sites — Eggs are laid in the soil; especially in cracks. Earthworms need not be present in the soil. The eggs hatch in 3 days or more.

Larval food — The larvae live on, and partly or wholly in, certain species of earthworms. The active first stage larvae bore in through the earthworm's integument on the dorsal side in or near the swollen portion (clitellum). Development requires 13-22 days.

Pupal location — -The pupae form in the soil. This stage lasts 11-14 days.

Adult food and feeding—Adults appear before snow is gone. They can be attracted to traps baited with banana and apple. Outdoors they are found on peony buds, and where tree sap is leaking from wounds. Feeding habits do not make this fly a likely disease vector. Adults may remain alive all winter without feeding if temperature is suitable and food available hibernating adults will feed.

Cluster Fly (After Howard)

Number of generations — Egg to egg laying takes 27-39 days. There are 4 generations a year in Washington State — probably two to four at Montreal.

Wintering stage — The winter is spent by the adult in hibernation. Original workers in France claimed this fly winters as a larva in the earthworm host. They were either mistaken or its habits differ there.

Winter quarters — In nature adults shelter in hollow trees, under loose bark, etc. They accumulate in attics, schoolhouses and other buildings; the same building being invaded year after year.

Attractants for adults — Sunny banks and walls, sweet materials.

Unusual habits, etc — The tendency to be gregarious and winter in numbers is the most interesting and annoying habit. DeCoursey in 1927 says this fly was then reported from every province in Canada, but I can find no record

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in Alberta until 1935, when I captured a specimen on a window in Edmonton, in 1936 and 1947 they were numerous. Prof Spencer of the University of B. C. states that he first found it in 1940 in Vancouver. Did it spread across Canada and over the Rockies?

At temperatures below 50°F adults avoid light, seek dark places and narrow spaces where they squeeze in, above 50°F they come out of the light.

LESSER HOUSEFLY[3]

(*Fannia canicularis*)

Egg laying sites — The eggs are laid on or in rotting organic materials — especially rotting fruit such as tomatoes.

Larval food — The Larvae feed on rotting vegetation, garbage, etc.

Pupal location — Soil.

Adult food and feeding — Exudations on fruit, i.e., from cracks, broken skin, etc.

Wintering stage — Probably pupae.

Winter quarters — Soil (?)

Attractants for adults — Ferments.

Unusual habits — The adults hover over-ripe or spoiling fruit, etc., flying back and forth. The eggs are easily ingested with fruit and maggots have been reported from faecal matter, and urinogenital tracts. This larva seems one of the most likely to survive in the intestinal passage in man but information is not completely convincing.

POMACE FLIES[4]

(*Drosophilarepleta*)

Egg laying sites — The eggs are laid on fermenting fruit or other media on which yeasts are growing. The sites are very varied. They turn up in such different sites as pickled laboratory specimens dried out of formalin solution, overripe grapes, bananas, potatoes, etc. *Drosophila repleta* seems favored over *melanogaster* by more putrefaction. They hatch in about 30 hours. One adult lays about 500 eggs.

Larval food — The larval food is generally considered to be yeast. The larvae occur near the surface of fermenting masses, i.e., jars of pickles, rotting fruit, wine, fermenting sap under bark of newly dead trees, even faecal matter. The larvae cannot penetrate intact skins of tomatoes, etc. They must enter cracks. *D. melanogaster* alone enters cracks showing no mold or decay. The larval stage takes six days or more.

Pupal location — The larvae leave the food mass and pupate in any dry material nearby. The pupal period is about five days.

Adult food and feeding—Adults require moisture and sugar to continue living.. In nature they feed on sweet exudates, rotting fruits, etc.

Number of generations — The total life history requires about 12 days. This will allow 12 or more generations in a year here.

Wintering stage—No one seems prepared to say definitely how these insects winter this far north. As with other flies the pupal stage would seem to be the logical one, but it seems doubtful that it could be so prolonged. Adults occur during the winter in potato storage houses, basements and even around urinals. Possibly breeding continues in such places all winter.

Winter quarters — Soil (?)

Attractants for adults — Various mixtures of alcohols and acids normally resulting from fermentation are attractive to adults, i.e., amyl and ethyl alcohol, acetic and lactic acids in the proportions present in fermenting fruit.

Unusual habits, etc. — *Drosophila melanogaster* is, of course, the famous genetics fly. Its short life history, simple rearing, and the occurrence of several varieties has made it the chief test animal of the geneticist and basis for most of our knowledge of the subject.

The eggs because of their location, are easily ingested but there seems little likelihood of the larvae causing intestinal myiasis.

THE HOUSEFLY[5]

(*Musca domestica*)

Egg laying sites — The housefly prefers to oviposit in or on fresh horse manure less than two weeks old. Denied this site is will lay eggs on moist pig manure, chicken droppings, cow manure with straw, straw continually wet with urine, matresses (such as those in baby cribs) allowed to become urine soaked, or other rotting materials. Artificial cultures grow well on mixtures of alfalfa meal, bran, yeast and dextrose. The medium must not be too acid. Usually a suitable medium gives off ammonia and cabon dioxide. As with blue and green bottle flies adults may visit many places where rotting vegetation occurs such as garbage cans, without laying eggs. Finding adults in such places is no proof of breeding there. Probably garbage is occasionally just right but it is usually too acid. *Muscina stabulans* (Lesser Stable Fly) is much more apt to lay in such places especially in such media as rotting tomatoes.

The eggs are laid in from 2 to 21 masses of 130 eggs each over 2 to 12 weeks. They hatch in 24 hours.

Larval food — The larvae feed on horse manure, etc., as above. This stage requires 3 to 7 days up to 8 weeks under adverse conditions. In one case a record of 115 days is given for larval development. In piles of horse manure only the outer 4 inches is cool enough for development though larvae can stand 116°F. if kept moist.

Pupal location — The pupae form in soil or dry material near larval food. Migration from food in search of pupation quarters may extend up to a 50-yard radius. Pupae take from 3 days to several weeks to develop.

Adult food and feeding — Sugars and all sweet fluids are imbibed. Surfaces of all kinds are tested for suitablity by "spitting" on them. This results in the well-known light colored "vomit" spots distinguishable from dark faecal spots. Bacteria, fungal spores, tapeworm eggs, protozoan cysts, etc., are ingested, regurgitated or passed in the faeces, still viable. All this adds to the formidable list

3. REFERENCES

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4. REFERENCES

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Founded 1923

THIS YEAR we have completed 25 years of service to the Insecticide Industry.

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We have earnestly tried to keep pace with this progress and to serve our old and new friends in the same spirit of mutual confidence with which we started out.

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of diseases this insect may and does transmit.

Number of generations — The total development takes 10 to 35 days but may require months. This allows 12 to 15 or more generations here. One pair in April, allowed to reproduce without check (plenty of food, no disease, etc.) could theoretically have 191×10^{18} offspring in August. These, it is said, would cover the earth 47 ft. deep.

Wintering stage — As the old song says, "Where do the flies go in the wintertime?" This is still somewhat an unsettled question. In Texas larvae and pupae have been shown to live from Nov. 26 to May 26 and emerge. Pupae may overwinter here but I am inclined to agree with Minnesota workers that continual slow breeding in barns and other suitable heated buildings accounts for most of our carry over. I have seen maggots all winter in wet bedding in calf pens.

Winter quarters — soil (?) — heated barns, etc.

Attractants for adults — Adult houseflies are attracted by odors of animals, odors of rotting organic materials, ammonia, alcohol and curiously by formaldehyde at low concentrations (1 oz. to 16 oz. of milk). They are also attracted to lights and especially to certain wave lengths such as the very short ultra violet ones and possibly to some extent the blue-green band. Certain wave lengths of yellow and blue have been considered to attract them least. This has given rise to these colors being used in factory and dairy windows. Dairy windows and even inside walls are occasionally painted blue to repel flies. The evidence is that this has no effect beyond reducing light intensity which in turn reduces numbers in empty barns but does not counteract the attractant effect of the odor of animals and animal excrement.

Unusual habits, etc. — As typical habits one may cite the previously mentioned vomit spots, the habit of roosting on walls, light cords, etc., and the tendency to enter buildings if temperatures go below 60°F. Adults become inactive at 45°F., crawl slightly at 48° and fly voluntarily at 53°. Many adults appear dead in the fall, stuck on walls, windows, etc., surrounded with halos of white. These have been killed by the fungus disease *Empusa musca*.

The literature of medical entomology lists many records of housefly larvae in vomit and faeces of patients. Early workers in the U.S.A. claimed many of these records were well authenticated. The more recent feeling is that contamination and mis-identification occurred frequently. It seems most unlikely that the larvae could survive the passage through the human gut . . . however, passage might take place in case of diarrhoea caused by other elements in infected food. One reported case of infested syphilitic sores seems well founded.

Adults were long thought to stay very close to breeding grounds but released marked adults have been recaptured five and even thirteen miles away from the point of release. Nor does it seem likely that such migration is only due to local food lack, but rather that flies normally wander along from one garbage can to another, for considerable distances.

5. REFERENCES

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How to Remove Bees from Chimneys and Walls

BY L. HASEMAN

Department of Entomology, University of Missouri

PEST CONTROL operators who have not as yet been called upon to remove a swarm or a colony of bees from a home have a real treat in store for them. Bees, as you know, swarm out in the early part of the season when their hive or other abode becomes overcrowded. Just shortly before swarming the colony sends out scouts whose job it is to find and prepare a new abode for the swarm when later it issues from the old stand.

In preparation for swarming, the colony also selects and "feeds up" one or more female or worker grubs to become full-fledged young queens one of which later will take the place of the mother queen after she leaves the old home with the swarm. The nurse bees stuff their prospective queen grubs with a rich food known as "royal jelly" and on this diet they can mature a queen in 16 days whereas the sister workers require 21 days to mature and their half brothers, the drones, require 24 days to pass from the egg stage to the fully winged adult. I refer to the drones as half brothers because that is exactly what they are. They develop from eggs which never receive a male sperm so they all are fatherless individuals while the workers and future daughter queens mature from fertilized eggs. To those of you familiar with poultry and animal breeding and perhaps not fully acquainted with the wonders of the insect world this may seem strange, but believe it or not it is the facts in the case. A pure bred yellow queen mated to a black drone will produce all yellow sons or drones while the female offspring, the workers and queens, will be mixed.

After the scouts have located a new home and one or more young queens are well along in their development the colony selects a warm day to swarm out and settle on a limb, and if not hived by the beekeeper they later go to the new abode previously chosen by the scouts. Hollow trees furnish ideal new homes for swarms

(Continued on page 50)

New Business Opportunities for PCO's

Extensive tests, employing Du Pont ANTU, are opening up new fields for pest control operators:

NOW—PCO's may service edible products departments of meat packing plants with ANTU . . . as specified in Meat Inspection Division Memo No. 52, Supplement 2, of Bureau of Animal Industry, U.S. Department of Agriculture, dated March 17, 1947. (Copies available from Du Pont on request.)

ALSO—PCO's may now service candy and confectionery manufacturing establishments with ANTU . . . as outlined in National Confectioners' Association Bulletin No. 8, dated May 2, 1947.

Professional Service Needed

Demand for your professional services will increase because of these new servicing opportunities. In addition, the opportunities for your services are almost unlimited, especially among hotels, restaurants, office buildings, apartment dwellings, warehouses.

Officials point out that the rat population is now at its highest level, with estimates on the total number running as high as *five hundred million.*

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BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

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HOW TO CONTROL FLIES

BY DR. W. N. BRUCE

Assistant in Entomology
Illinois State Natural History Survey Division

THE FIRST important consideration in fly control is sanitation. House flies breed usually in garbage, manure, and all types of decomposing organic matter. Since their life cycle may be only 14 days and their larval stage may be as short as 4 days, it is necessary to remove the breeding material at least twice a week if you are going to influence in any measure the fly population by sanitation.

Stable flies are found breeding in the decomposing litter around straw stacks, hay stacks, and around feeding racks. As far as our observations go the latter is the most important. We have also found it very difficult to find the immature stages of stable flies in straw and hay residues around the respective stacks. On the other hand we have found literally thousands of immature stable flies under feed bunks or troughs and feed racks. In one instance we collected an estimated 57,000 from about 3 square feet of surface. The breeding residues for stable flies should be removed once or twice a week.

It is obvious that if we practice proper sanitation around buildings and farms, we will have few failures in fly control.

Horn fly control is practically only through the use of DDT or other residual sprays.

The resting cites are iminently related to the control of the specific ply. House flies are found principally in and around buildings. In fact, our observations would indicate that 90 to 98 percent of the flies within a barn are house flies. The stable fly, on the other hand, seems to prefer outdoor shelters such as trees, outside surfaces of buildings, open sheds, and around hay or straw stacks. Being bloodsucking flies, they are frequently found on surfaces adjacent to the cattle.

For treatment of the interior and exterior surfaces of farms, we are recommending 1 pound of 50 percent DDT water-wettable powder in about 3 gallons of water. This should be applied to about 1,000 square feet of surface.

House fly control is most readily attained by the inside treatment of barns, chicken houses, hog sheds, and surfaces adjacent to and in entryways of houses, restaurants, and food processing

Common House Flies swarm on top of dirty garbage cans

Based in part on an address given by Dr. Bruce at the 12th Annual Purdue Conference.

Special Techniques For Barn and Cattle Spraying

plants. Such a treatment eliminates, to a large extent, the possibility of direct food contamination.

For stable fly control it is desirable to extend the residual treatment to outdoor surfaces such as upon sheds, outside surfaces of barns, under eaves, and even in trees. However, there is a practical limit to how much of the surface you can treat. Our results will indicate that you do not materially affect the stable fly population on the animals or outdoors by merely treating interior surfaces. In many cases it is necessary to use emulsions or oil solutions to get around the unsightly white, chalky residue of the wettable powder. The wettable powder appears to be the best formulation to use on all surfaces as far as effectiveness is concerned.

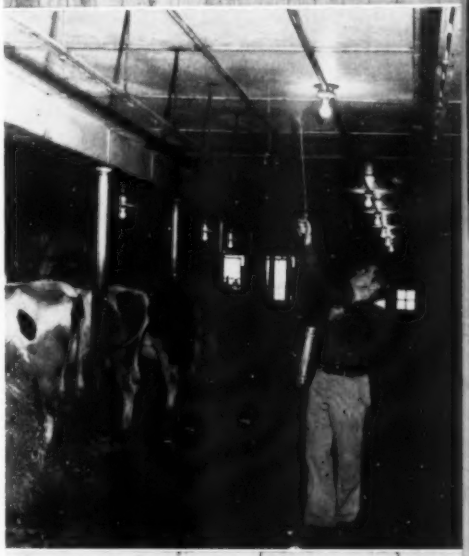
Animal Treatments

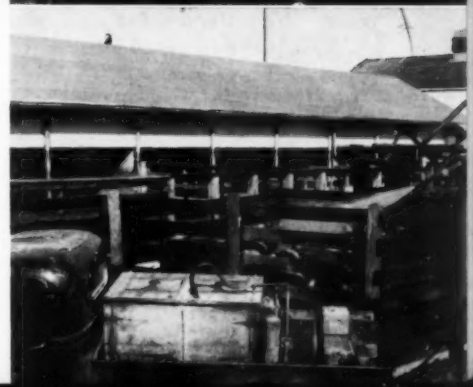
For the control of horn flies on beef cattle or on dairy cattle use one-fourth pound of the 50 percent DDT water-wettable powder in 3 gallons of water and apply this at the rate of about 2 quarts per animal at 3, 4, and 5 week intervals.

For stable fly control on dairy animals, and incidentally the same treatment eradicates horn flies, one should use about 1 pint per cow of 1 percent DDT spray once a week. To obtain a 1 percent spray use ½ pound of 50 percent DDT water-wettable powder in 3 gallons of water. In our treatments we confined the application of this material to the front legs, brisket, neck, shoulder, and back of the cow. We did not find it necessary to treat areas adjacent to the udder nor within the radius of the tail. Stable fly control is not as spectacular as horn fly control. The stable fly population decreases more slowly to a point where they are not very annoying to the cattle. We have had instances in our experiments where stable fly control was not very effective. These failures were traced to adjacent untreated herds which supplied a daily influx of flies. In other cases isolated herds have been kept free of stable flies. You cannot forget about sanitation in stable fly control.

TIFA Fog Machine

Preliminary tests with the Tifa Fog machine would indicate that it has great penetration powers within confined spaces. We actually killed flies buried beneath about 6″ of clothing within a clothes shoot of a house. About the only space we did not get penetration was in a very tight cedar chest with a tongue groove lid and in the refrigerator. The panels exposed for residual studies would indicate that very little of the residue impinged upon vertical surfaces whereas much of it was found on horizontal surfaces.





Illustrated

1. **Spraying barn entrance way**
2. **Garbage cans and exterior are sprayed for house fly control**
3. **Spraying interior of barn**
4. **Beef cattle being sprayed for horn fly control**

All pictures courtesy of Illinois Natural History Survey Circular 626 entitled "Fly Control" by W. N. Bruce and H. B. Petty.

MUST WE TOLERATE MOSQUITOES?

Osmun says "no" by presenting control procedures for larval and adult stages

JOHN V. OSMUN
Professor of Entomology, Purdue University

AUGUST 4, 1945 was a warm drizzly day on a little island off the Atlantic coast. In fact most of the previous month had been pretty much like it, but the important thing about that particular day was that it heralded the start of two memorable mosquito weeks. Nearby in New Jersey and New York, some resort areas closed their doors because there was no business; parks were beautiful but uninhabitable; camping areas were vacated. Mosquitoes, prolific from the warm wet weather, had taken over. DDT was well known by then and people rushed to buy what little was available. Few, however, knew how to use this new insect killer.

Now nearly three years later the same potential menace of mosquitoes is with us. DDT and other formidable mosquito toxicants are available in ample supply, but we still ask how many know how to use them? Must we each year in nearly all parts of the country tolerate outbreaks of mosquitoes? The answer is no, if the problem of control is attacked intelligently. We are dealing with an insect that in all its delicate and truly exquisite structure is in reality a resourceful and cunning competitor.

The problem of mosquito control has been considered seriously in certain localities for many years. New Jersey for example has long been organized into county control commissions; California has its active abatement group. Most of the work, however, has been aimed primarily at larval control — not adult control. The methods and equipment needed have been impractical for the pest control operator. Today, however, we have tools with which to combat adult mosquitoes and we have business as the incentive. Several members of the Pest Control Association have taken note of summer camps, resorts, parks, athletic fields, cabin and trailer areas, and private homes. More are recognizing the potentialities.

Two General Groups

To approach control sensibly requires a working knowledge of the mosquitoes in one's area. Each mosquito may present its own problem and although we can discuss general control measures, many special instances are certain to arise. Let us first consider the nature of mosquitoes. These insects belong to the order *Diptera*, family *Culcidae*, and like other flies have but two wings. They are characterized as small, soft bodied flies, each with long slender abdomens, narrow wings, and mouthparts prolonged into a proboscis. In the females the mouthparts are modified for piercing and sucking. The males are incapable of piercing and therefore suck no blood.

It is convenient to separate mosquitoes into two general groups, *culicine* and *anopheline*. The latter includes only those known as *Anopheles*, for example *A quadrimaculatus*, the Malaria Mosquito. Mosquitoes of the genera *Culex*, *Aedes*, *Psorophora*, *Mansonia*, etc. are included as *culicine*. Characteristics of anopheline and culicine follow:

	Anopheline	Culicine
Eggs:	Laid singly each with two air floats.	Laid in rafts of 50-200. Laid singly near the water where tide or flood will stimulate hatching.
Larvae: "Wigglers"	Lie parallel to the surface. No air tube. Feed on water surface. Growing stage.	Hang down from surface at 45° angle. Prominent air tube. Feed primarily below the water surface. Growing stage. . .
Pupae: "Tumblers"	Difficult to separate. Two air tubes. Active when disturbed. No feeding.	
Adults:	Rests at 45-80° angle. Wings mottled and dark.	Rests parallel to surface. Wing markings indistinctive.

NOTE: Difference in head appendages illustrated on page 20.

(Continued on page 20)

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Development from egg to adult averages for most species 9-15 days during warm weather.

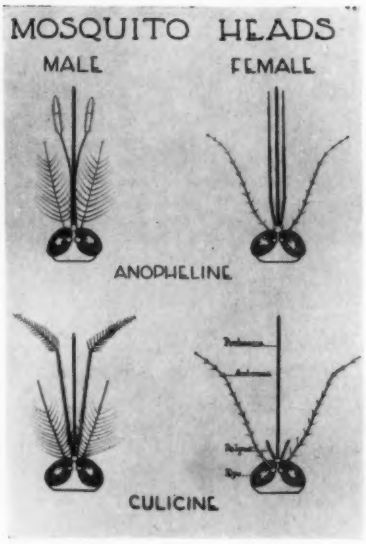
With these characteristics in mind, consideration can be given to several of the more common and important species of possible interest to the pest control operator.

Anopheles quadrimaculatus, the Malaria Mosquito. As the name implies, this mosquito has four black spots on each wing. This is a medium-sized species, dark brown in color and clothed with numerous golden hairs. The larvae thrive in rather clear, still water with abundant vegetation. Overwintering occurs as adults and these mosquitoes can be found in sub-freezing weather in cellars and sheds. It is well known that this moquito, found from Massachusetts to Florida and westward to Nebraska, is the principle vector of malaria in the United States.

Culex pipiens (*C. quinquefasciatus* in the South similar), the Common House Mosquito. A rather non-descript brown mosquito with conspicuous white bands on the bluntly rounded abdomen. This noisy, persistent mosquito enters houses readily and will bite throughout the night. The larvae breed in catch basins, cesspools, ditches, and even rainbarrels. Eggs are laid in the characteristic culicine rafts.

Aedes Sollicitans, the Salt Marsh Mosquito. These mosquitoes are notorius for their ability to migrate many miles and descend in large numbers on groups of people. This is a medium sized mosquito with a white-banded proboscis, golden brown thorax, abdomen banded and with a yellowish white stripe, and the leg tarsi white-banded. As the name implies, development is associated with salt water. Larval control is specialized.

Aedes vexans, the Swamp Mosquito. This is one of the most important pests and is characterized as a bronzy-brown with a black abdomen banded with prominent white scales; the abdomen



is rounded at the tip and the tarsi of the hind legs are white-banded. The eggs are laid in depressions subject to flooding by rains and flood waters. It is interesting and important that these eggs may remain dry for many months before water reaches them and stimulates hatching.

Aedes aegypti, the Yellow-fever Mosquito. Although yellow fever is no longer existant in this country, the small vector of it remains common in the South. This mosquito is easily identified by the silver lyre-shaped marking on the black thorax. It is very urban in its ways and breeds in everything from roof drains to flower vases. Control is rather specialized.

Psorophora ciliata, the Giant Fringed-legged Mosquito. This is one of our larger and equally vicious mosquitoes. As the common name indicates, the legs are bushy due to the presence of erect yellow and black scales. The thorax is brown with a brilliant golden yellow stripe down the middle. The larvae, which occur in rainfilled pools, are predacious on other mosquito larvae. Overwintering occurs in the egg stage.

Mansonia perturbans, the Irritating Mosquito. This species is included because of the unusual larvae. The latter have conical air tubes modified with saw-like projections fitted for piercing plant tissues and securing oxygen from these aquatic plants. Control necessarily involves vegetation removal or the use of insecticide emulsions. The adult is essentially black with pale scales on the proboscis, thorax, and legs; the abdomen and legs are banded with white.

Control Methods

A general discussion of control necessarily leaves some questions unanswered due to the differences in mosquitoes and the varieties of control methods. We can, however outline a general guide for the majority of problems. Just where each pest control operator fits into various phases of control activities depends on location, demand, and circumstances.

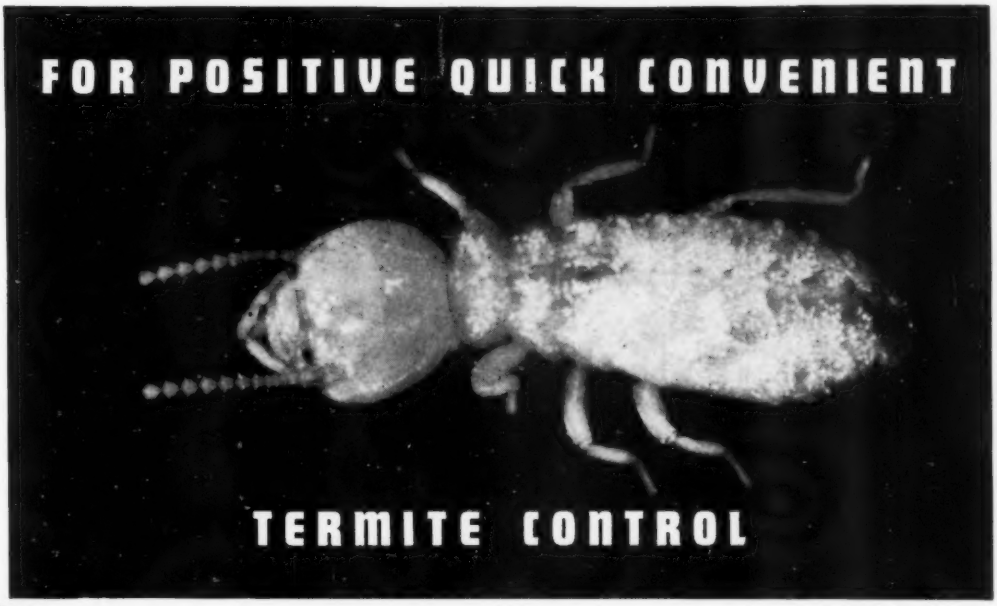
Larval control in small scale operations such as people's yards and estates, roadside ditches, swamps, and drains can be handled most effectively by utilizing DDT in light, easily-spreading fuel oil. To this may be added mutually compatable solubilizing materials to step up the percentage of DDT desired. Keep the quantity of oil low but the amount of DDT per acre as follows:

	Initial Kill:
anopheline	—0.05-0.25 lbs. actual DDT
culicine	—0.25-0.50 lbs. actual DDT
	Residual kill
anopheline	—0.5 - 1.0 lbs. actual DDT
culicine	— 1 - 2 lbs. actual DDT

Application may be made by *drifting* a fine spray from conventional 2-3 gallon sprayers, or when small ditches are the concern by using a lubricating type oil can with as little as a pint of oil per acre.

Adult Control is very practical with materials available today. Outdoor spraying for *residual* control is accomplished by using 12-16 pounds of 50% wettable DDT in 100 gallons of water. Application ranges from 10 gallons in sparcely vegetated areas to 25 gallons per acre where considerable plant growth exists. Use high capacity equipment and spray all possible resting places thoroughly; include the surrounding

FOR POSITIVE QUICK CONVENIENT



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areas in this treatment! Immediate, but *temporary* protection is often desirable for baseball games and other special events. New Jersey Larvicide No. 1 diluted 1-10 with water can be used by fogging the atmosphere in late afternoon and spraying the area thoroughly. When prevailing winds bring in mosquitoes during the evening, the air can be fogged from the windward side. N. J. Larvicide No. 1 is an oil-water concentrated emulsion containing the equivalent of 1 pound pyrethrum flowers (0.9% pyrethrins) per 1.5 gallons concentrate. Some relief may be experienced using a thermal fog generator with appropriate knockdown agents but success is dictated by wind direction.

It is often desirable to treat home and buildings as a protection against mosquitoes. Screens are perhaps number one in importance and they may be treated by applying 5% DDT in petroleum insecticide base using a felt covered roller or wick-type reservoir applicator. Bedrooms, porches, and cabins are among the places often requiring residual application. The key to success here is to leave a deposit of the insecticide where mosquitoes are most likely to rest.

Overall success in mosquito control hinges very largely on having a clear picture of the problem involved, knowing the mosquitoes to be combated, and applying the insecticides at needed intervals. There seems to be no really good reason why we must now tolerate our old companion, the mosquito.

Program Taking Shape for 16th Annual NPCA Convention

I. B. CARNCROSS, General Chairman for the 16th Annual National Pest Control Association Convention to be held in Toronto, Canada, October 18, 19, and 20, has announced that the program for this meeting is rapidly taking form.

It is reported that much of the program will be confined to the business phases of the pest control industry and therefore two or three sessions will be open only to NPCA members.

Convention headquarters will be at the Royal York Hotel where a limited number of roms will be available for those attending. Through the cooperation of the Toronto Convention and Tourist Association and other Toronto hotels an ample supply of rooms is assured for visiting delegates, however it is suggested that hotel reservations be made early. Rates at the Royal York have ben set at a minimum $4.25 per person per day, two to a room. Arrangements for this annual meeting are being made by the following who will assist Carncross: (1) National Committee; John K. Medoff, W. New York, N. J.; Martin T. Meyer, Philadelphia; Charles Riess, Winnipeg, Man., Canada; Glenn H. Burnett, Atlanta; W. A. Ruwaldt, Corpus Christi; D. C. Tracy, Los Angeles; Arden Price, Chicago; Oscar L. Potter, Ecorse, Mich.; Paul McMahon, Binghamton, N. Y.; William O. Buettner, Brooklyn; (2) Toronto Committee: Victor E. Prentice, Local Chairman; D. Sanderson, Secretary-Treasurer and Entertainment; H. N. Dickinson, Registration; W. E. Bomby, Publicity; E. F. Abell, Advertising; Mrs. V. F. (May) Prentice, Ladies; C. E. Ryder, Hamilton, Ont., Reception, and Jack Rudick, Montreal, P. Q., Booth Exhibit.

New Washington Releases

A comprehensive report summarizing recent investigations of the wartime discovered insecticides, hexachlorocyclohexane and its active gamma isomer, "Gammexane," and revealing the highly toxic effect of the hexachlorohexanes on many species of insects is now on sale along with three other related reports. These can be obtained from the Office of Technical Services, OTS-1097, Commerce Department, Washington, D. C.

Recent Army chemical corps research on insecticides, rodenticides, means for dispersal and on the impregation of clothing with insecticides, miticides and repellents is described in a report that can be obtained from the Office of Technical Services, Commerce Department, Washington, D. C.

The U. S. Department of Agriculture has announced two publications: E-742 — A Review of DDT Formulations. R. D. Chisholm; and E-744 — Preliminary Tests of Synthetic Organic Compounds as Insecticides. Part V. G. T. Bottger and A. P. Yerington. For copies write the Bureau of Entomology and Plant Quarantine, Washington 25.

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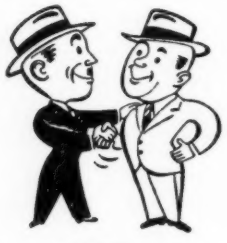

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COMMENTS by the Editor

Caution on Community Fly Drives

EFFORTS of the Junior Chamber of Commerce in their "Fly-Free America" campaigns scheduled for this summer are laudable if they don't get out of hand. We only hope that these Jaycees do not fall into the same rut they fell into in several communities when they became top-heavy with their ideas of rodent control some time ago. The industry is still undoing some of the nonsense these organizations developed which resulted in competition for private enterprise, including the taking of contracts by city officials and even causing jobs to be lost that would otherwise have gone to pest control establishments.

It is not hard to see how these public-spirited younger men would like to see everyone, everywhere benefit from their campaigns and would unthinkingly endorse a sort of PWA project by local governments. But PCOs can help prevent that sort of thing if they will take an active interest in these programs by giving professional guidance and pointing out how necessary it is for experienced hands to do the work. This should be done to protect your own business. It is not the Junior Chamber's intention to harm any business and so by making them realize pest control operators should be called in to apply the chemicals they will actually have a more successful public health campaign with less repercussions than if they went off half-cocked without any of our industry's counsel.

Bill Objects

OUR EDITORIAL report on the industry's celebration of Bill Buettner's fiftieth birthday, entitled "Deserved Recognition," was sent to Brooklyn to be sure the details were right. Bill wasn't supposed to have seen it, but he did and strong pressure was brought from modest Bill to drop the whole thing. To quote from his letter, "I cannot get away from the fact that whatever progress has been made should directly be attributed to the splendid way in which many men in the industry have taken off their coats and have given, not only of their time and money, but in genuine work that calls for considerable sacrifice . . . and therefore, do not welcome any program that forgets the outstanding contributions of many unsung hard-working members of our Association."

We hardly agree that the achievements of the pest control industry over the past decades are the result of good teamwork, and in no way do we want to minimize the importance of the cooperative effort. It is seldom, however, that we can publicly recognize William O. Buettner's part in our industry's growth and so, Bill's objections notwithstanding, we took his arrival at the half-century mark to do so.

Suppliers' Support

OUR SUPPLIERS are often critized for going direct to our customers to sell insecticides, rodenticides, etc., used by the PCO in his work. But many of these same suppliers, through their advertising, are doing much to keep the work of pest control operators before the public. Advertising to the consumer, in most cases, is aimed only at small package users for home application. In any case these materials can be used more effectively when handled by carefully trained pest control operators and manufacturers are quick to recognize that fact. A recent issue of *Institutions Magazine* carried an advertisement of Julius Hyman & Company wherein this company told the institutions trade to inquire of their pest control operator. For this kind of cooperation our industry is grateful. We can use more of it.

When Do You Receive PESTS?

WE HAVE received a number of complaints during the last year from subscribers telling us they are not receiving their copies of *PESTS and Their Control* until three, four and five weeks after it is mailed. In April *PESTS* was mailed on the 5th of the month and it didn't reach your editor until the 20th, even though we are only 30 miles from our printer. The May issue was mailed on the 9th of that month, and a man in Boston told us he didn't receive his copy until the 22nd. If you don't receive your copy by the 15th of the month of issue, will you write us giving the date this magazine arrives. We shall then take your letters to the proper authorities to see if this delay in delivery can be corrected.

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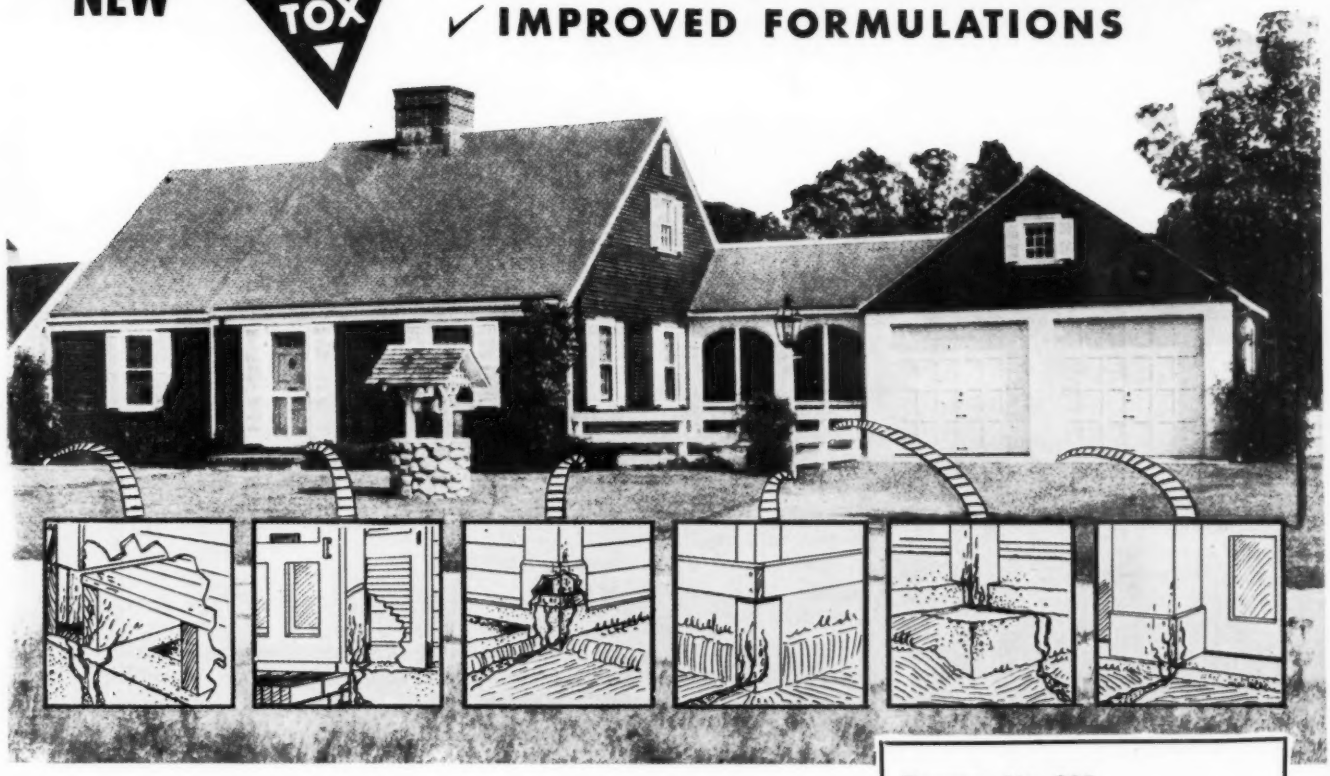

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PCOs— A Major Factor In Fly Control

A Guest Editorial by

Professor J. J. Davis

Head, Department of Entomology

Purdue University, Lafayette, Ind.

THE "Bug of the Year" at the regional conferences in 1948 was the "Fly," or perhaps we should say "Flies," which term includes not only the housefly but also mosquitoes, stable flies, horn flies, scavenger flies, screw worm flies, moth flies, vinegar flies, and others.

But perhaps greatest interest centered on the housefly, recognized as one of the greatest pests of all mankind throughout the world, because of its potential importance as a carrier of disease organisims.

With the development and universal use of the tractor and other mechanical devices and the decrease in the use of animal horsepower, there are decreasing facilities for fly breeding. Even though horse manure, a favorite host of fly larvae, is becoming less available, it should be remembered that the housefly may breed in any kind of decaying material, even rotting paper. And so, although the use of horses for farm power is being decreased by the development of mechanical power, thus gradually eliminating the favorable breeding places, the housefly still has many materials which it may use for its development, and like the farmer is not dependent on the horse.

In the days of the McGuffey Reader, we find that the fly is extolled as an interesting creature with no thought of its menace to human health. The opposite is true today.

With the severity of typhoid fever in concentration camps during the Spanish-American War in 1898, and the discovery that the housefly was the active carrier, it became a recognized menace and a disease carrier of enormous potentiality. It was in the years following that "swat the fly" became a national slogan.

Thus was the beginning of fly control with the fly swatter as a major weapon. In those early days we aided our parents in "shooing" flies from room to room and out the back door and were ready to quickly shut the back door when the flies were all "shooed" out.

Then followed a period of mechanical controls. These included use of window and door screens, intended primarily to prevent the entrance of flies, the development of fly traps, and the continued development and use of fly swatters. All are still major factors in fly control.

Thereafter came the development of the common household fly sprays, or space sprays, with pyrethrum and later synthetic chemicals as the active ingredients.

With the essential need of protecting our armed forces during World War II, the remarkable fly and mosquito repellants were developed, as well as the residual sprays, notably DDT. These were developments of greatest importance to humanity and doubtless have been responsible for saving thousands of lives and, incidentally, in winning the war against Japan months, probably years, sooner than would have been possible without such essential aids.

Although of major significance in winning the war, these developments have been responsible also in protecting us all against disease carrying flies and in preventing huge losses which otherwise result from annoyance to domestic animals, especially dairy cattle, thus preventing contamination of one of our most important and valuable food products, an important safeguard to our millions.

With these developments the pest control operator becomes an increasingly important factor in the health of our nation by providing efficient control service, especially in dairy establishments.

Yes, the nation is awakening to the importance of flies, mosquitoes and other Diptera, not alone as annoying pests but as vectors of major ailments, and as factors in sanitation. It was not many years ago that our citizenry tolerated flies. Now they do not tolerate a single fly.

Thus during the past 75 years with McGuffey Reader's gentle handling of the housefly, we have gone through a series of major developments until now we find the PCO a major factor in fly control and the health of our people.

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SERVING INDUSTRY...WHICH SERVES MANKIND

REPORT *on the Newer Chemicals*

By

Dr. C. R. Twinn

Chairman, Technical Committee
Canadian Pest Control Association

SYNTHETIC residual insecticides continue to have a marked effect on the P. C. O. industry. It is stressed that the industry is going through a period of transition due to the impact of the new synthetic insecticides, and both optimistic and pessimistic viewpoints are advanced as to its future. Prof. J. J. Davis, of Purdue University, and Mr. S. A. Rohwer, of the U. S. Bureau of Entomology, make the most appropriate comments. Prof. Davis stressed the need of P. C. O.s having more knowledge of insects and insecticides, and pointed out that there is always a market for experience and dependable service at reasonable cost. Mr. Rohwer said that pest control was going to succeed with the industry, or in spite of it, and that the P. C. O. must learn to be a specialist, so that he can do a better job of pest control than the public, using chemicals effectively and sanely.

Skill and experience, and thorough and conscientious work, are more important than new chemicals in doing a good job of pest control whether the pests be insects or rodents. In this connection, P. C. O.s would be well advised to use new chemicals with caution, especially as manufacturers are sometimes inclined to be more enthusiastic in their claims about such products than available experimental evidence warrants.

About a year ago I published a paper entitled "The Newer Insecticides, Repellents and Rodenticides of Value in the Field of Public health."[2] A limited supply of reprints are still available to those interested. The following notes may be considered as supplementary to that publication.

More is known about the formulation, application, advantages and limitations of DDT than any other of the new synthetics. This fact, and its effectiveness against many species and unrivalled residual persistence, should insure it a continued prominent place in the P. C. O.s' armory of materials.

Among promising synthetic competitors for DDT, chlordane is probably the most useful from the P. C. O.'s point of view, especially as a means of controlling cockroaches and ants, including the hitherto difficult to combat Pharaoh ant. A considerable number of proprietary preparations containing chlordane have recently been registered for sale in Canada.

Regarding benzene hexachloride, its greatest disadvantage has been its disagreeable and persistent odor. However, some manufacturers claim they have succeeded in producing gamma-BHC preparations that are practically odorless, but caution should be exercised until this has been established in actual practical application. Gamma-BHC is outstanding as a means of controlling ticks and mites and may be used in combination with DDT to obtain the more prolonged residual action of the latter in preventing reinfestations.

The chlorinated camphene known by the trade name of "Toxaphene" is slow acting and reported by Knipling[2] to be inferior to DDT as a space or residual spray against houseflies and also against the American cockroach. Parker & Beacher,[3] however, state that it compares favorably with DDT as a residual toxicant against houseflies and bedbugs, although it has a slower knockdown; also that it is about as toxic as DDT to adult male German cockroaches. Incorporated into fabrics, they found it provided protection against moths and carpet beetles.

Methoxychlor (the methoxy analogue of DDT) and the close DDT relative known as DDD have been reported as generally less effective than DDT against various species affecting man, but to have the advantage of being much less toxic to warm-blooded animals.

Hexathyl tetraphosphate is an unstable compound and highly toxic to warm-blooded animals and is thus not suitable for P. C. O. use.

Parathion (diethyl p-nitrophenyl thiophosphate) is another new insecticide under investigation that has been found promising against many species of crop pests. It is not considered as suitable for use against household and stored products insects because of toxic hazards.

Among old, well-established insecticides, pyrethrum is outstanding because of its qualities of safety and quick-acting effectiveness, and is better understood and appreciated than ever before. Its value is increased by using it in combination with activators. One of the most promising of these is piperonyl butoxide, which has been demonstrated to be a good insecticide, an excellent synergist, and an unusually safe ingredient for use in insecticides. Surface applications of mixtures of pyrethrins and piperonyl butoxide have been shown to have prolonged residual effectiveness against houseflies.

On the subject of the newer rodenticides, one of the most interesting items at the Philadelphia N. P. C. A. meeting was a report by Dr. James C. Munch, indicating that there is a seasonal cycle in rat susceptibility to Antu. The m. l. d. or LD50 from April to November was 6mg. per kg., but from December to March it increased to 260 mg. per kg. The rats used in the experiments weighed approximately 100 grams and could be got to eat only 15 mg.

(Continued on page 50)

Based in part on a technical report presented by Dr. Twinn at the 6th Annual Canadian Pest Control Operators' Association Meeting held in Montreal this year.

1. Sci. Agr. 27:3, 97-104, March, 1947
2. Knirling, E. F. "Newer Synthetic Insecticides," Soap & Sanitary Chemicals, July, 1947.
3. Parker, W. L. & J. H. Beacher, "Toxaphene, a Chlorinated Hydrocarbon with Insecticidal Properties," Del. Agr. Exp. Sta. Tech. Bull. 36, Feb., 1947.

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SUGGESTIONS FOR TRAPPING RATS

By JOHN C. JONES

BIOLOGIST
Fish and Wildlife Service
U. S. Department of the Interior

TRAPS have several useful and important functions in the control of rats. They should be used to clean up residual or remaining infestations after poisoning operations and to pick up new invaders as they appear on the scene. They also provide a means of destroying rats without running the risk of odors, since they hold rats in place where poisons would tend to cause them to die in walls or other inaccessible places. Trapping can be effective if the traps are placed properly and in sufficient quantity.

Proper placement is far more important than the selection of a bait. Rats follow natural runways as far as possible, running along walls and stacked materials, rather than cutting across the middle of the room in the open. Their instinct for stealth and desire for protection causes them to pass behind objects set or leaning against the wall. The best baited trap will rarely entice a rat into the middle of the room, but on the other hand, a rat will pass over a trap rather than detour wide into the open. Traps should always be set in natural runways, perpendicular to the line of travel, so that the trap is open to approach from either direction. Use enough traps. Set 4 or 5 for every rat you are trying to catch.

Despite its reputation, cheese is not an infallible bait. Bacon strips, a piece of fresh fish, or bacon-scented oatmeal are better. Such baits should be tied firmly to the trigger to prevent stealing them without setting off the trap. Do not allow baits to remain long enough to spoil or become rancid. Do not allow dead rats to decay in the trap. If this should happen, scald the trap before re-using, but do not worry about human or rat odors on the trap. A freshly-killed rat in a trap will not frighten other rats away; to the contrary, live rats frequently will feed upon it. Nor is it necessary to throw a trap away once a rat has been caught in it. If blood or entrails are stuck on the trap, scrape them off before using it again. The longer a trap is in use the more likely a rat is to approach it.

It is not necessary to bait a trap. Enlarge the trigger surface of an ordinary snap trap with a square of cardboard or a piece of tin about 3 inches square, making the entire trigger half of the trap a treadle (Fig. 1). A square of corrugated paper, with the trigger forced between the two layers of paper, will also serve. If desirable, a smear of bait can be rubbed on the surface as an attractant.

Traps with the enlarged trigger should be placed in such a manner as to force the rats to cross over the exposed surface, by blocking a runway behind a box, nailing to a beam, or placing on a ledge that is in frequent use. (See figs. 2, 3, and 4). When laying flat on a surface, shredded paper in a thin layer can be used to mask the trap. By using a hose clamp with a long bolt projection, a trap can be fitted to a pipe by drilling a hole through the trap and fitting it over the projection bolt (Fig. 5). Keep the traps set at all times.

Mice may be trapped in a similar manner. Baiting is usually more successful with mice than with rats, a wide variety of food being quite acceptable. Cereals, bread crumbs, cake crumbs, peanut butter, milk chocolate, and oatmeal.

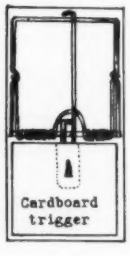


Fig. 1

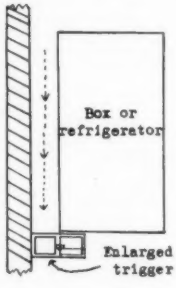


Fig. 2

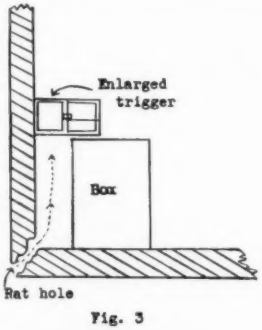
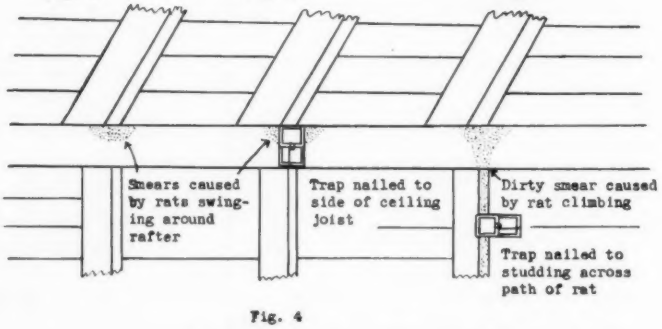


Fig. 3


Smears caused by rats swinging around rafter
Trap nailed to side of ceiling joist
Dirty smear caused by rat climbing
Trap nailed to studding across path of rat
Fig. 4

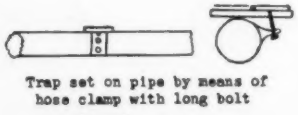


Fig. 5

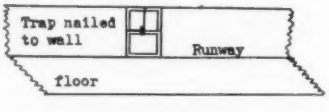


Fig. 6

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PCO NEWS...

Need for Preservatives Cited

An estimated annual textile damage of $50,000,000 and a yearly drain on forests of more than 30,000,000 cubic feet of timber used in replacement of decayed lumber is caused by mildew, dry rot, termites and other insects it was declared by the May 16th meeting of the Louisiana section of the American Chemical Society meeting in New Orleans.

In stressing the importance of preservatives in extending the life of structural timbers and heavy duty fabrics such as tarpaulins and ropes, Dr. Edwin R. Littman of Sanco, Inc., said there is a definite need to conserve not only the wasted dollars but also the materials. Replacement timber represents approximately 10 per cent of the total annual cutting in American forests, he said, and reports indicated that current lumber consumption is up to 30 per cent over the rate of tree growth necessary to meet the demand.

Rose Moves in Mass. and Cal.

It's bigger and better offices for Rose Exterminator Co. offices on both the East and West coast. In Boston, Mass., the Rose Co. moved across the street from their former location to 109 Staniford St., where they have a more modern store and greater window display room. Lester West is in charge of that branch.

New headquarters for the Southern California Rose Exterminator Co., Inc., Los Angeles is at 2630 La Cienega Blvd., just across from Culver City, the movie center. Ernie Forde says, "we have a marvelous plant, and a fenced-in yard for storing building materials."

Mich. Chemical Board Members

Recently elected to the board of the Michigan Chemical Corp., St. Louis, Michigan, are R. A. Bondurant and L. W. Munchmeyer.

George Marks

Innis, Speiden Transfers Marks

George Marks, for the past nine years New England Sales Manager for the Insecticide Division of Innis,Speiden & Co., New York, has been transferred to San Francisco where he will be West Coast manager of Insecticide Sales.

Joseph Lyons fills the post vacated by Marks. Lyons has been working from the company's New York office for the past year and a half.

Both Marks and Lyons assumed their posts on the first of June and will continue to offer sales service wherever soil fumigation and industrial pest control are a problem.

"Pests Are Optional"-Eldridge

NPCA past president, Bartlett W. Eldredge will be one of the principal speakers at the Massachusetts Public Health Conference and New England Health Institute to be held at University of Massachusetts, Amherst, June 16-18. Eldredge, who is also former prexy of the New England Pest Control Association, will speak during the sanitation section meeting to be held at 9 a.m., Friday, June 18th. His talk is entitled, "Pests Are Optional."

Velsicol vs. Julius Hyman

A court order filed by federal district judge, W. A. Black, in and for the city and county of Denver, Colorado on April 12, restrains Julius Hyman & Company, Denver, Colorado, from advertising, selling and manufacturing their chlordane product, known as "Octa-Klor," which the court found to be a duplication of "Velsicol 1068," property of the Velsicol Corporation, 330 East Grand Ave., Chicago, Illinois.

According to justice Black, Dr. Julius Hyman, inventor of the insecticide while executive vice-president of the Chicago firm in 1945, violated an agreement to keep secret the formulaes and manufacturing processes for this product. Black said that Dr. Hyman, unable to obtain a greater participating interest in Velsicol, had illegally formed his own company in 1946 and had used "1068" as a trademark.

The Denver court ruled a 60-day stay of execution and 60 days to tender a reporter's transcript.

Statement from Hyman

The following statement was received from Julius Hyman & Co., dated May 14, 1948:

"The recent decisions in the lower courts in Chicago and in Denver in the litigation between Velsicol Corporation and Julius Hyman & Company and various individual defendants will be appealed . . . There will be no interruptions in the production and marketing of Octa-Klor brand technical chlordane. . . ."

A letter dated April 30 from W. E. McCauley, Hyman entomologist, states, "Our legal counsel have again assured us that those who buy and use Octa-Klor will incur no liability whatever."

George Lay Dies in Korea

Our deepest sympathies go to Mrs. George B. Lay of Columbus, Mississippi because of the death of her husband in Korea on May 6th. Available information indicates that George died as a result of a liver ailment at a time when he was due to return to the United States.

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★ **PER-MO 5 YEAR GUARANTEE MOTH PROOF LIQUID**
Packed in Pints, Quarts, ½ gals., gals., and 5 gal. containers

★ **PER-MO FLAMEPROOF LIQUID**
Packed in Gallon containers or in Drums.

★ **PER-MO RAT & MICE LIQUID**
Packed in 8 oz. bottles or in gallon containers.

★ **PER-MO RAT BITS MADE WITH RED SQUILL** (FORTIFIED)
Packed in 4 and 16 oz. containers or in Bulk.

★ **PER-MO RAT PASTE, MADE WITH RED SQUILL** (FORTIFIED)
Packed in 4-8-16 oz. jars, and in Bulk.

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Packed in 4-8-16 oz. jars, and in Bulk.

★ **PER-MO "CHEK" DEODORANT**
Packed in Quarts or in Gallons.

WE WILL SHIP YOU A GENEROUS SAMPLE OF ALL THE ABOVE PRODUCTS FOR $5.00 EXPRESS PREPAID. Send Check or Money Order.

PER-MO
STANDS THE TEST
IT'S BY FAR THE BEST

★ **All Per-Mo Products Packed Under Your Private Label If Desired.**

Write Today . . . Full Particulars First Letter

PER-MO PRODUCTS COMPANY
3602-04-B Woodland Kansas City 3, Mo.

THE INSIDE STORY

PETERMAN PROFESSIONAL LINE

PETERMAN HAS THE KNOW-HOW:

For the large-scale user, be he PCO or other, we believe that our practical laboratory and field work on products is of value. We know how to formulate, how to evaluate, and how to manufacture quality products.

PETERMAN INSECTICIDES ARE TAILOR-MADE:

We sell only quality products tailored for their intended jobs and correctly labeled to meet all legal requirements. . . . . Peterman can fill your needs for quality products.

Quality Insecticides for Quantity Users

WILLIAM PETERMAN, INC.
411 Wilson Avenue
NEWARK 5, N. J.

Specialized engineering and precision construction have only one purpose here . . . to give you exact control of spray pattern, distribution, and atomization . . . as well as impact where required, for any given liquid volume and pressure. For your requirements, you will find that Spraying Systems Spray Nozzles can always give you more in performance . . . to improve operations and lower cost. Catalog 22 gives you all the facts.

SPRAYING SYSTEMS CO.
Engineers and Manufacturers
4093 W. LAKE STREET • CHICAGO 24, ILLINOIS

WRITE FOR CATALOG 22

Training Bears Fruit

About two months ago, J. R. Gross,, Cleveland entomologist and director of education for the Ohio PCOA, began training prospective pest control service men for local PCOs. Proof of the success of that training program comes in that all of his men passed the recent rather severe Cleveland Health Dept. examination to become licensed pest control operators. Only one-third of the men taking the exam received a passing grade, and half of that successful third were Gross' trainees.

Persons interested in getting more information about this pest control institute should write Gross at 10523 Churchill Road, Cleveland, Ohio.

Masons Honor Herbert Meyer

Mount Neboh Lodge, No. 257 F. & A. M. recently honored the homecoming of The Right Worshipful Herbert Meyer, District Deput and Grand Master, Third Masonic District of Manhattan with a special program at the Pythian Temple in New York city. Herbert Meyer is associated with Fumex Sanitation, Jamaica, N. Y. and is well known to PCOs in the East.

PCO's Daughter Gives Recital

The New York Madrigal Society presented Karen Hasselriis, Dramatic Soprano, in a voice recital at the Barbizon Recital Hall, New York City, May 11th. Miss Hasselriis is the daughter of C. H. W. Hasselriis of the Ratin Laboratory, Inc. She has studied under Yves Tinayre and was a scholarship student at the Mannes School.

A Big Event for a Small Family

Mr. and Mrs. George W. Small are happy in a great big way over the birth of their daughter, Susan, on May 5th. Father is associated with the Ransford Insecticide Co. of Worcester, Mass. Our best wishes go to these proud parents in no small measure.

David Lynch

Lynch Heads Insecticide Sales

David W. Lynch is new sales manager of the Insecticide Division, Velsicol Corporation, Chicago. Mr. Lynch, associated with John Powell & Company for fourteen years, has been actire in the affairs of the NAIDM, NPCA and American Association of Economic Entomologists. Well known in the insecticide industry Lynch is married and comes from New York. "Dave" has a preference for loud ties and the stylish women's hats Mrs. Lynch deftly creates.

Berman Passes Cigars

Hearty congratulations go to the proud parents of the new Berman heir. Mr. and Mrs. Dave Berman of the Northwest Exterminating Co., 95 Broadway, New York City, are the happy couple and Robert Hiram Berman is the new son, born April 1st.

Johnson USDA Medical Officer

Dr. Melvin T. Johnson has been appointed as Medical Officer and Chief of the Division of Employee Health in the Office of Personnel, Dept. of Agriculture. Dr. Johnson, who is the first to fill the post created under Federal legislation authorizing health programs for Federal employees, assumed his post May 1.

Order Insecticides Early, USDA Advises

Prospective users of insecticides should purchase or place orders now for the materials they will need to combat insects, the U. S. Department of Agriculture advises.

While the supply of a number of insecticides probably will be sufficient to meet the needs this year, in a few cases there may be tight supply situations toward the end of the growing season. Therefore, all prospective users are advised to buy their insecticides as early as they can. Early orders for insecticides, it was pointed out, will help suppliers anticipate the demand.

Prices for several kinds of insecticides, as well as for some of the chemicals used in insecticides, have decreased some during the last few months.. This is particularly true of DDT and insecticides using this chemical. On the other hand, the price of lead arsenate has increased slightly. It appears that prices are now fairly well stabilized. Significant reductions are not expected during the remainder of the growing season.

Strong emphasis is being placed this year on insect control as one phase of the USDA food and feed conservation program. Among the pests under attack are insects in stored grains, insects annoying livestock, and insects causing losses to growing crops. Insecticides provide the key to most of such control work.

(Continued on page 49)

Buffalo Picks Harry Lewis

The Commissioner of Public Works for the City of Buffalo, N. Y. has recently appointed Harry S. Lewis of the Rose Exterminating Co. as industry representative on a committee of five in connection with that city's new ordinance relating to pest control.

Orkin Expands in Little Rock

The Orkin Exterminating Co. in Little Rock, Arkansas, has moved into larger quarters at 1309 West Capitol Street. Luckily, they are keeping their old phone numbers.

BE A LEADER IN TERMITE CONTROL with an ANTIMITE FRANCHISE

PROFITABLE, PROTECTED FRANCHISES AVAILABLE

Demand for Scientific and effective termite control is increasing — and we are expanding our facilities to meet the need! Qualified representatives for the ANTIMITE system of termite control are needed in certain localities to keep pace with this fast-growing business.

These valuable advantages are yours if you can qualify:

- Completely protected franchise for your locality.
- Scientifically engineered specifications and formulations used successfully for over 20 years.

Certain territory is available to qualified operators — write today about the Antimite franchise for your locality.

ANTIMITE

The ANTIMITE Company
5137 SOUTHWEST AV.
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MGK

PYROCIDE

Booster CONCENTRATES

"More Power for Fly Sprays and Roach Sprays"

Boost THE KILL

These new Booster Concentrates develop more "kill" per gallon than any product we have ever offered.

Boost THE KNOCKDOWN

The spectacular "knockdown" power of Booster Concentrates gives greater satisfaction.

Boost YOUR PROFITS

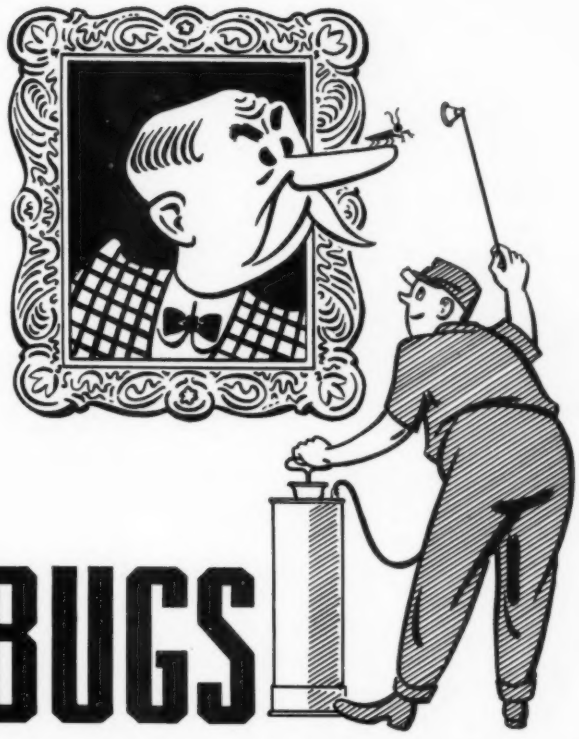
You simply dilute one part in twenty for a grade AA Spray. Thus you get an efficient product plus a savings in time and ingredient costs.

Write for specification bulletins on booster concentrates for fly spray and roach spray.

Better Insecticides

McLAUGHLIN GORMLEY KING CO.

MAKERS OF INSECTICIDES — FOUNDED 1902
MINNEAPOLIS, MINNESOTA



BUGS

ARE FOUND IN FUNNY PLACES

DON'T SAY CHLORDANE—SAY RESIDEX

Can't say we've had to RESIDEX the bug on grandpa's nose, but if it would help—we wouldn't hesitate.

Since you *have* to spray the same areas every visit for routine insect control—you want a refined insecticide to avoid stains.

Since you occasionally *must* spray rugs, furniture, clothing, and even wallpaper, where stains would mean disaster—a refined insecticide is demanded.

RESIDEX has the answer to your Chlordane needs. Take RESIDEX 20 for instance—In spite of its 20% Chlordane content, RESIDEX 20 is practically water white.

DON'T SAY CHLORDANE—SAY RESIDEX

RESIDEX has a formulation to suit your Chlordane needs no matter what your preference.

Use oil solutions? Then you want RESIDEX 20.
Quick breaking emulsions? Ask for RESIDEX 30.
Stable emulsions? RESIDEX 50, of course.
Just plain don't know? We'll help you decide.

DON'T SAY CHLORDANE—SAY RESIDEX

Chlordane means a lot of things. RESIDEX means Chlordane at its very best. Write for our Chlordane Color Comparitor Kit and see for yourself.

RESIDEX
CORPORATION
FOOT OF CENTRE STREET, NEWARK (2) N. J.
PHONE, MARKET 3-0566

Deserved Recognition

MAY 9, 1948 is a date the NPCA Secretary, Bill Buettner, will never forget. On that day Bill celebrated his fiftieth birthday. On that day the pest control industry acted in unison to pay tribute to the father of its progress. On one trip alone, a Western Union messenger delivered 72 telegrams to Bill's home in Brooklyn, N. Y. There were flowers, presents, unique messages and telephone calls. It was a memorable day for Bill.

The pest control industry has come a long way since Bill Buettner started helping in his dad's exterminating business thirty-eight years ago. Smudge rags were used to smoke rats out of holes so that the "rat catcher" of the day could hit them over the head with a paddle-like gadget. Sodium fluoride was only coming in. It was a disgrace for anyone to have bugs. The "bug men" almost had to steal in and out of premises to avoid any embarrassment to their customers. These were the days Bill began learning the trade through practical experience. He was just 12.

Bug chasing was so interesting that Bill left high school and for five years his main job was to help his dad. During part of that time he served in World War I, but in 1919 he returned to preparatory school and then on to Dartmouth College from which he graduated in 1924. Sociology was Bill's major in in college, for that seemed more important than the physical sciences because an important part of the exterminator's work was to get along with people. Schools had little to offer in the field of bugs that was practical to the verminologists. Pest *control* was unknown in those days.

The year 1933 was a turning point for the exterminating industry. That year gave birth to the NRA. Bill and others were quick to recognize that if the industry didn't organize to restrict itself, the government would step in and do the job for it. The *Exterminator's Log* (forerunner of the present *PESTS*) carried an open letter from William O. Buettner in September, 1933. He was inviting the country's exterminators to join together in a national organization to express themselves better on matters involved in the National Recovery Act and other problems confronting the industry. On October 2, 1933, the National Association of Exterminators and Fumigators, Inc., was formed at a convention in Washington, D. C., and Bill was elected its first President. In 1934, at the second annual convention in St. Louis, Thomas C. Raley succeeded Bill as President, but William O. Buettner was elected to become secretary of the Association, a position he has held ever since.

The years ahead were busy ones. Bill spent a goodly portion of his time working with Federal government officials in Washington discussing methods of giving more recognition to this comparatively new field. He was coordinator between the government and the country's pest control operators.

In October 1933 the Association changed its name to the one it carries today.

Bill was outspoken in the industry's behalf and it was only natural that government officials should recognize his work by appointing him consultant to serve with the War Production Board.

During World War II, Brooklyn was the place members of the National Pest Control Association turned to when they could not find sources of supply. There, Bill in most cases knew or found out where the materials members needed could be obtained.

Untiringly, Bill Buettner has burned the midnight oil to help solve the industry's problems; to help local, regional and state organizations form on a sound basis. He is responsible for a number of "firsts," not the least of which is the establishment with Professor J. J. Davis of the annual Purdue Pest Control Operators' Conference.

In all of his work, William O. Buettner has maintained a sincere singleness of purpose and earnest respect for fair play. He is a true friend of the industry who always insists that pest control standards be set higher and higher.

Most men so occupied with their life's work would have little time for anything else. But realizing the importance of proper proportion, Bill has remained an excellent family man to his devoted wife, Helen, and two sons, Bill, Jr., a junior at Dartmouth, and Ted.

PUT 'EM ON THE *Spot*

use NEOCID DDT COMPOSITIONS

Roaches, bedbugs, fleas, mosquitoes haven't a chance when you—

***Dust with* NEOCID A-10** — a ready-to-use DDT powder

***Spray with* NEOCID D-30** — after dilution with deodorized kerosene

These highly effective formulations were developed by Geigy Company, *"Originators of DDT Insecticides."* They are backed by 9 years of experience in DDT compounding and application.

If your local dealer doesn't have these NEOCID* DDT Compositions, just send us his name and address.

*Reg. U.S. Pat. Off.

ORIGINATORS OF DDT INSECTICIDES

GEIGY COMPANY, INC.
89 Barclay St., New York 8, N. Y.

THE PCO SERVICE CASE MADE TO LAST

Case Illustrated — 18 Inches High

Constructed of vulcanized fibre (the best fibre material made today), and varnished inside and out for protection against chemical corrosion, this PCO Service Case will give you good service for years and years. We have it in other sizes for you, and we also make them up to order; send us your requirements and learn more about these Service Cases we make especially for PCOs.

DURABLE FIBRE SAMPLE CASE CO.
17-19 West 3rd St. New York 12, N. Y.
JOBBER INQUIRIES INVITED

MAGIKIL ANT BAIT JELLY

Easy TO USE

KILLS ANTS

CONTAINS THALLIUM SULPHATE

Packed in Convenient Service Containers

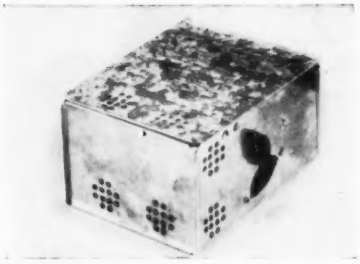
ANT TRAPS
1, 3, & 7½ oz. Tubes
10 Lb. Jars

Used professionally it assures customer satisfaction.

Preferred by discriminating PCO's.

For safety in service work use MAGIKIL ANT TRAPS.

Lethelin Products Co., Inc.
MOUNT VERNON NEW YORK



"Ketch-All" Mouse Traps

Albia Products Co., 1 East 42nd St., New York City, is marketing the new mouse trap pictured above, which they call the "Ketch-All." Constructed of 28-gauge metal, it weighs about two to two and a half pounds and can catch from 15 to 20 mice a day with one setting, Albia states. This trap spanks the mouse into a rear compartment, and the mouse's commotion to get free is supposed to attract other mice who join him to play. To get rid of the mice, the trap is simply partially submerged in water for a few minutes, the top cover slid back and the dead mice can be emptied into an incinerator or refuse can without anyone touching the rodents themselves. The manufacturer suggests these traps are adaptable by the PCO to all phases of the food, dairy and restaurant industries.

New Orbis Catalog

A new 28-page catalog and price list has been published by Orbis Products Corp., 215 Pearl St., New York city. The booklet covers the complete line of Orbis essential oils, drugs, gums, perfume bases and insecticides.

Westvaco DDT Booklet

A new 12-page brochure on DDT and its application has been issued by Westvaco Chemical Corporation's Agricultural Chemicals Division, 405 Lexington Ave., New York 17. Dosage recommendations in the control of 98 different insects and parasites on 34 fruits and vegetables are included in the booklet along with a tabular digest giving instructions and suggested dosages of DDT mixtures to control common pests in farm buidings and on livestock. Copies can be obtained by writing the company.

Recommendations for Storage, Transit Problems

Suggestions made at the recent conference called by the Office of Food and Feed Conservation centered on the protection of food in storage and transit. The following recommendations were made after all angles of the problems were considered:

Ship only insect-free products.

Package them to prevent insect invasion.

Avoid mixed-lot shipments.

Isolate infested products from fresh supplies in transit.

Clean, spray and inspect boxcars and trucks.

Clean, spray or fumigate, and inspect holds of barges and ships.

Inspect and, if necessary, treat all food and grain shipments on arrival at destination.

Representatives of millers, railroads, insecticide manufacturers and government met with the OFFC and agreed that to check or eliminate infestation in transit, coordinated action by all handlers and shippers was necessary.

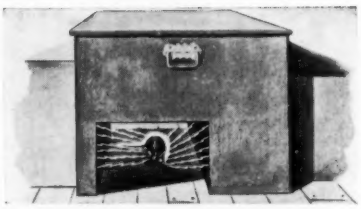
Powell Aerosol Formula

A new insecticide formula designed especially for use in the new "beer can" type aerosol bomb has been introduced by John Powell & Co., Inc., One Park Ave., New York Containing both pyrethrum and DDT, it is claimed the formula's effectiveness lies in the use of a synergist called Sesamin, developed in the Powell laboratories.

Sesamin, it is pointed out, steps up the killing power of the pyrethrins some 100 to 150% and gives any formula in which it is used greater toxicity against roaches. Researchers state Sesamin is completely safe to human beings and animals.

Velsicol Moves Connor

Arthur C. Conner, sales representative for the Velsicol Corp. working out of Cleveland, Ohio, has been transferred to that company's home office at 330 East Grand Ave., Chicago, Illinois. Conner will cover Illinois, Indiana, Ohio and Pennsylvania from his new headquarters.



Radar Used to Kill Rats

Radar Rat Traps have been developed by a company bearing that name at 7 Norfolk Place, Rochester, N. Y. The trap is an automatic one that captures and kills rats electrically, sellers say. This is how it works: the mechanism is set in motion when the rat enters an electrically charged field emanating from the mid-section of the trap's entrance tunnel. Absorption of the electrical charge by the rat's body shuts the doors of the trap. Seconds later, the identical procedure is repeated in the trap's death chamber. When the rat is killed, without burning or singeing, the dead body is ejected and the doors open again to await the next victim. The principle of the proximity fuse is the explanation for the operation of these radar traps. More information can be secured by writing the makers.

Hyman Techinal Supplement

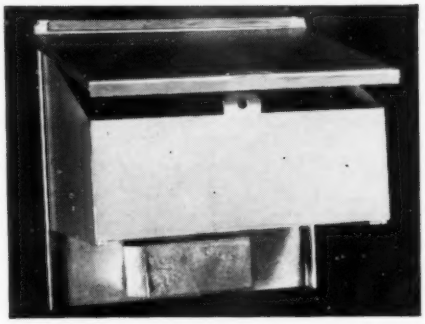
The availability of the following new technical literature has been announced by Julius Hyman & Co., Denver, Colorado:

Supplement No. 206 — Direct control of Clothes Moths, Carpet Beetles, and Other Pests Attacking Stored Products with chlordane.

Supplement No. 208A — Direct control of Plum Curculio and Other Fruit Insects with chlordane.

Stickers Promote PC Customers

Attractively printed in two colors, 1 x 1¼ inch stickers promoting public consciousness that pests are disease vectors are now being marketed by the Continental Chemiste Corp., 2068 W. Ogden Ave., Chicago, Ill. Red wording with a blue background reads: "We fight disease through insect and rodent control." A sketch of a baby is also included on these stamps.



RODENT CONTROL STATION

6-12 stations $2.00 each
12 or more $1.75 each

MICE-GLUE
GETS MICE LIKE FLYPAPER GETS FLIES
10 lbs. $6.00 25 lbs. $13.50 100 lbs. $45.00

BIRD-REPELLENT
Keeps Pigeons, Starlings and Other Birds from Buildings
10 lbs. $6.00 25 lbs. $13.50 100 lbs. $45.00

PHOSPHOROUS-PASTE
For Rats, Mice and the Large Brown and Black Roaches
10 lbs. $4.25 25 lbs. $9.00 100 lbs. $32.50

PEST CONTROL CHEMICALS CO.
324 BROADWAY WRITE FOR DETAILS BUFFALO, N. Y.

Use **PRENTOX**

CHLORDANE (Concentrates & Dust)

PYRETHRUM (Powder & Extract)

RED SQUILL (Powder & Liquid)

DDT PRODUCTS

For **PEST CONTROL**

PRENTISS PEST-TESTED
INSECTICIDE CONCENTRATES

are offered to manufacturers and pest control operators — exclusively. They are not available for consumer use. You are invited to consult our technical staff on any material, formulation, or manufacturing problem on which we may be able to render assistance.

R. J. Prentiss & Co., Inc.
110 WILLIAM STREET NEW YORK 7, N. Y.

New Profits . . .

FOR P. C. O.'S

NOW AVAILABLE
The amazing liquid that **STOPS** *the spreading of Flames!*
FLAME-CHEK

FLAMEPROOFS Rugs, Drapes, Upholstery, Paper, etc.

USED IN Clubs, Hotels, Restaurants, Theatres, Churches, Halls, Schools, etc.

- Applied by spraying
- No Special equipment
- Nation-wide approval

FLAME-CHEK

Write for Samples and Particulars

MOTH-CHEK ENDS MOTH DAMAGE for 5 YEARS

Yes • You can make New and Greater Profits with MOTH-CHEK which protects or pays the damage. Write for details.

- ODORLESS
- COLORLESS
- STAINLESS
- SAVES TIME
- SAVES MONEY
- SAVES WORRY

MOTH-CHEK
5-YEAR GUARANTEED MOTH PROTECTION

CHEK PRODUCTS CO., INC.
31 NASSAU PLACE, EAST ORANGE, N. J.

U. S. Junior Chamber of Commerce Sponsors National Campaign Against Flies

34 Cities and 6 States Lined-up for Anti-Fly Campaigns So Far

This year's major project of the United States Jr. Chamber of Commerce should be of interest to every pest control operator. Adopting a plan which originated with the Cleveland Jaycees, the national Chamber is sponsoring the first country-wide drive against flies.

Running from June through September, local and state-wide campaigns will make the public more fly conscious by attempting to place all fly-breeding spots under treatment. DDT is the major insecticide being recommended.

To date 34 municipalities and 6 states have organized fly control campaigns under Jaycee sponsorship. They are:

Florence, Alabama
Jasper, Alabama
Newton, Alabama
Los Angeles, California
Sylvania, Georgia
Herrin, Illinois
West Frankfort, Illinois
Elmwood, Indiana
Gary, Indiana
Terre Haute, Indiana
Mason City, Iowa
Shreveport, Louisiana
Cambridge, Maryland
Coldwater, Michigan
Douglas, Michigan
Bibbing, Minnesota
Glasgow, Montana
Camden, New Jersey
Roswell, New Mexico
Reidsville, North Carolina
Tarboro, North Carolina
Akron, Ohio
Ashland, Ohio
Canton, Ohio
Cleveland, Ohio
Galion, Ohio
Lakewood, Ohio
Shelby, Ohio
Stillwater, Oklahoma
Bristol, Tennessee
Austin, Texas
Kilgore, Texas
Richfield, Utah
Worland, Wyoming

The following states have adopted the plan on a state-wide basis:

Arizona
Minnesota
New Jersey
North Carolina
Ohio
Wyoming

Emphasis will be laid on four major objectives. (1) Treatment of public properties, refuse dumps, garbage trucks, public buildings, park restrooms, swamps and ditches, etc., (2) Treatment of commercial places of business and industrial plants with DDT, namely slaughter houses, dairies, restaurants, food and meat markets, canneries, hotels, theatres, transportation terminals, factories, office buildings, hospitals, etc., (3) Treatment of urban residential properties, such as window and door screens, porch ceilings, stagnant pools, chicken coops, dogs, outdoor toilets, backyard picnic areas, refuse piles, etc., and (4) Treatment of rural areas, stables, barns, outbuildings, compost pits, manure piles, swamps, ditches, cattle and livestock.

Harry Studier, Cleveland, E. B. Buchanan, Cleveland commissioner of health, and Al Akers, past NPCA Pres., Cleveland watching demonstration at Cleveland stadium (shown on front cover).

Jaycees in charge of this program state that no attempt is being made to compete with private exterminators who earn their livelihood from this work. Rather, they point out, this campaign will stimulate public demand for such services as people are made more aware of the diseases flies carry. According to a USDA estimate, flies and mosquitoes cost $165,000,000 a year in disease, depressed real estate values, and food losses.

In a brochure put out by the Cleveland chapter, the following is directed to PCOs and business in general.

"If you are a purveyor of DDT products, advertise them extensively so the public will know where to obtain DDT.

"If you are providing exterminator service, advertise your business so those with special fly-control problems may have the benefit of your assistance.

"Display 'Fly-Free Campaign' posters in your place of business.

"If you have window display space available, offer it to the Jaycee committee for use during at least part of the campaign."

Cleveland PCOs Cooperate

In Cleveland, Ohio, the drive begins with a two-week "DDT Blitzkrieg" June 1-12. Harry Studier, Guarantee Exterminating Co., and Al Akers, past NPCA President associated with Rose Exterminator, both of Cleveland, are cooperating with the Jaycees by staging demonstrations with their TIFA equipment. The Central Market, Cleveland Municipal Stadium, city dump and some municipal buildings will be, or have been exposed to sample fog treatments. Climax of the Cleveland campaign, as now planned, will be a grand parade down Cleveland's main thoroughfare, Euclid Avenue, during the noon hour on a busy weekday with both Akers' and Studier's TIFA machines shooting simulated DDT fog up into the air. Newspaper, radio and television coverage has been granted to this Cleveland campaign.

Political Importance

Besides the public benefit derived from such a community project, it is pointed out that its political significance to health department officials is an important reason public office-holders are cooperating when such a program is suggested for their community. Such campaigns give deserved recognition to a city department that usually gets very little good publicity.

Pest Control operators interested in finding out more about plans in their own communities are advised by the national Jr. Chamber to contact local chapter offices which may be listed either as Jr. Chamber of Commerce or

(Continued on page 42)

Pyrenones*

make BETTER *insecticides*

PYRENONE-TYPE INSECTICIDES, of the type recently publicized for the *safe* protection of grain cereal products, are available to PCO's from a rapidly increasing number of manufacturers. Use them in storage warehouses . . . in wholesale grocery warehouses . . . in storerooms of retail groceries . . . in delicatessen stores . . . wherever safety is a primary factor.

U.S.I. INDUSTRIAL CHEMICALS, INC.
CO East 42d St., New York 17, N. Y.
Branches in All Principal Cities

IN CANADA: Standard Chemical Co., Ltd.,
195 Fleet Street East, Toronto 2, Canada

**Reg. trade-mark*

MODERN PEST CONTROL

requires

CONTROL OF HAZARDS, *TOO!*

APPROVED BY
U. S. BUREAU OF MINES

Every quality of protection and comfort, required and appreciated by the pest control operator working with hydrocyanic acid gas, is provided in full measure by the popular M. S. A. GMK Gas Mask. Featuring the All-Vision Facepiece, with large-area contoured lenses permitting unobstructed vision through all normal viewing angles, and affording a snug gas-tight seal without binding, the Mask is equipped with a strong, light-weight harness which permits complete freedom of movement. Replaceable canisters offer long service-life; every detail of the M.S.A. GMK Gas Mask provides top value in the field. Please write for Bulletin ED-11 and consult us for recommendations as to other respiratory protection.

MINE SAFETY APPLIANCES CO.
BRADDOCK, THOMAS AND MEADE STREETS
PITTSBURGH 8, PENNA.
District Representatives in Principal Cities

Spread and Power

Effective pest control requires wide spread of insecticide and the driving power to force it into every crack and crevice—under mouldings, behind baseboards, around plumbing, between cases and bales.

MISTMASTER Ball Bearing Fan Type Sprayers have both the spread and the power to do a quick, thorough job. Driven by 1/3, 3/5, or 1 hp. motors, they spray insecticides for distances as far as 40 feet, penetrate into hard-to-reach places, and spray large areas quickly, completely.

Here is a sprayer that has more power than any other portable sprayer, yet is convenient and easy to handle. Equipped with 1-gallon non-corrosive tank, driven under low pressure with a high volume of air, it can be used with any type of insecticide, either oil base or water base, and carries insecticides into remote openings in full volume and power.

Used anywhere, it plugs into any electric outlet, and is supplied with three nozzles for fine, medium, or coarse spray, can also be furnished with 2-gallon tank and special nozzles or in special design to meet individual requirements.

WRITE TODAY for further details and complete specifications or mail the coupon.

SPRAYER CORPORATION OF AMERICA
1700 Payne Street, Evanston, Illinois
☐ Send complete information on MISTMASTER Ball Bearing Fan Type Electric Sprayers
☐ We are interested in details of your dealer franchise.

Name _____
Address _____
City _____ **Zone** ____ **State** ____

Sprayer CORPORATION of AMERICA
1700 PAYNE STREET, EVANSTON, ILL.

Under the MICROSCOPE

or Little Known Facts About Pest Control

By J. R. Gross

EDITOR'S NOTE: *This is the first in a monthly series of columns written by Mr. Gross, a graduate entomologist, which will present an exchange of pest control ideas. For some of our readers the information will be new and helpful; for the more experienced operator this column will serve as a welcome refresher of facts they may have forgotten.*

SPIDER BEETLES MAY BE A SIGN OF RATS

Almost any building with a rat population is also a perfect set-up for the Spider or Hump Beetles, (*Gibbium Psylloides Czemp* and other species.)

When you find these little beed-like red insects, look also for more definite rat evidence. You will find it.

Although spider beetles are general scavengers, one of their most common food sources is rat manure. They breed in rat droppings the same way that bean weevils breed in whole beans. The beetle lays its eggs on or near the pellet. The tiny white worm which emerges from the egg digs in. There it feeds, grows, and matures into the adult beetle which chews its way out into the open.

These wingless insects crawl so slowly that they almost appear not to move at all. At the slightest disturbance they play possum.

The best place to find them is where the rat manure is thick, but some will be found all through the building. Once in a while spider beetles will cause damage to textiles or other products. It may be difficult to eliminate them until you first destroy the rats and clean up the rat manure.

A NOTE TO THE VETERAN OPERATOR

In the years of your experience, you have gathered many gems of technical information. Share them with our readers by sending them for publication. Address: Under the Microscope, Pests and Their Control, 1900 Euclid Bldg., Cleveland 15, Ohio. Each contribution published will be properly credited.

— J. P. Gross

TIFA Club Organized

The first meeting of the TIFA Club organized to serve owners of this new fogging equipment in Ohio and Michigan was held at the Carter Hotel, Cleveland, O. on May 7 and 8th. Called by Harry Studier, President of the Ohio PCOA, 26 men came together to learn how their machines can be used most effectively. During the session motion pictures were shown and field demonstrations were made at a flour mill, food plant and dump. Each owner was given a handsome leather file to keep information regarding the TIFA machine as it is published. Definite chemical formulations were worked out for exclusive use in this equipment. The following men attended this meeting:

Herman C. Militzer, H&M Laboratories, Toledo, Ohio.
Ray Terrell, Arab Pest Control Co., Springfield, Ohio.
C. Norman Dold, Rose Exterminator Co., Chicago, Ill.
A. M. Akers, Rose Exterminator Co., Cleveland, Ohio.
R. C. Yeager, Rose Exterminator Co., Cincinnati, Ohio.
Harlem B. Ives, Rose Exterminator Co., Detroit, Mich.
Richard J. Andes, Vogel-Ritt Inc., Columbus, Ohio.
H. B. Jordan, Arab Pest Control, Indianapolis, Ind.
Claude A. Selway, State Exterminating Co., Massillon, Ohio.
Harold Portwood, TNT Exterminating Co., Akron, Ohio.
Earl S. Abell and son, Ralph, Toronto, Canada.
Joseph Decell, Michigan Chemical Co., St. Louis, Mich.
Al Williams, Todd Shipyards Corp., New York.
Harold Berk, Warren Chemical Products Co., Warren, Ohio.
Robert Williams, Cleveland Jr. Chamber of Commerce.
Harry Studier, Guarantee Exterminating Co., Cleveland, Ohio.

Several of these men brought some of their service men along.

Catalog of Insecticides and Fungicides Ready

Dr. Donald E. H. Frear, Professor of Agricultural and Biological Chemistry, Pennsylvania State College, State College, Pa., has announced that Volume I of his "Catalogue of Insecticides and Fungicides" entitled "The Chemical Insecticides," is now available.

This is the first of two volumes listing the chemical compounds and plant species which have been tested for insecticidal and fungicidal value.

Over 6,000 compounds on which insecticidal tests have been made are included in this first volume. For each compound the chemical name, formula, test insect, test results, patent and literature references are given in brief form. This information is supplemented by a unique coding system, by which it is possible to obtain indications of the relation of chemical structure and toxicity.

This book, and its companion volume on fungicides and plant insecticides soon to appear, should be of great use to chemists, entomologists, patent lawyers and others who are engaged in the search for or the study of potential pest-control materials. Workers in the field of pest- control chemicals will find this book a valuable reference. This 203-page volume can be obtained by sending $6.50 to Chronica Botanica Co., Waltham, Massachussetts.

The second edition of Dr. Frear's other book, "Chemistry of Insecticides and Fungicides" is expected to be available very soon.

Dates Set For Eastern Conference

Monday, January 31st to Wednesday, February 2nd, 1949 is the period during which the Eastern PCO Conference will be held at the University of Massachusetts, Amherst, next year.

Junior Chamber Fly Campaign

(from page 40)

Jr. Board of Trade. Or write to Mr. Robert Richards, Executive Secretary, U. S. Junior Chamber of Commerce, Akdar Building, Tulsa, Oklahoma, who will be able to tell which towns are planning Jaycee "fly-free" campaigns.

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ORGANIZATION NEWS...

Group attending 4th Annual Florida PCA meeting held at U. of Florida, Gainesville, April 22-24, 1948

Wilson Elected Florida PCA President At 4th Annual Meeting Held at Gainesville

H. F. WILSON, D-W Chemical Laboratories, Jacksonville, Florida, was elected president at the short business session held during the Fourth Annual Meeting of the Florida Pest Control Association at the University of Florida, Gainesville, April 22-24. Others elected to office at that meeting were: Vice-president, H. O. Earnest, Terminix Service, Miami; Secretary-Treasurer, O. P. Brink, Orkin Exterminating Co., W. Palm Beach. The following were named Directors: T. Roy Young, Tampa; Kenneth W. Young, Daytona Beach; Peter Clements, Ft. Lauderdale; J. M. Roper, Miami, and Walter A. Helms, Jacksonville.

A laison Committee was appointed for the purpose of discussing important pest control matters with the Structural Pest Control Board of the State of Florida, and the State Health Dept. Committee members are: Theodore Oser, Chairman, Atlanta, Ga.; J. P. Walker, Orlando, and W. A. Snare, Miami.

The three-day Gainesville meeting was held in conjunction with the Florida Entomological Conference in cooperation with the NPCA. Dr. John T. Creighton and other members of the University faculty gave valuable assistance which made this conference one of the most successful to date.

Chairmen for the conference were: John M. Roper, retiring President of the Florida PCA; Professor Creighton, Head, Dept. of Entomology, University of Florida; and Walter H. Thames, President, Newell Entomological Society.

President Roper called the meeting to order Thursday morning, April 12 by introducing the distinguished guests and visitors.

Walter Thames presided over the morning session with Professor Creighton speaking first with

(Continued on page 46)

'49 Purdue Conference Dates

Reverting back to its between-semester dates, the Purdue Conference for 1949 will be held February 7-11, Professor J. J. Davis has announced. This scheduling seems to permit more PCOs to attend without interrupting the beginning of their busiest season.

30 Form Kansas T&PCA

At the invitation of Dr. Roger C. Smith, head of the department of Entomology, Kansas State College, 30 PCOs met at Fairchild Hall, April 17th, to form the Kansas Termite and Pest Control Association. Election of officers named the following: President, Reynold Shuyler, Termites Exterminating Co., Kansas City, Kansas; Vice-President, Robert R. Schendel, Schendel Pest Control, Topeka; Secretary-Treasurer, G. H. Armstrong, National Termite Control, Inc., Wichita. Directors chosen are: U. O. Hawks, Interstate Exterminating Co,; R. E. Powell, Fred M. Powell Co.; R. E. Lacy, Red Wing Chemical Co.; and Fred A. Moore, Moore Chemical Co. The following were present at this first meeting:

L. H. Thouvenell, O. K. Termite & Pest Control, Peabody
L. M. Ratley, Peerless Termite & Pest Control, Emporia
H. A. Stedman, Cook Chemical Co., Kansas City, Mo.
J. O. Hibbard, Manhattan Pest Control, Manhattan
Roger C. Smith, Kansas State College, Manhattan
R. E. Lacy, Red Wing Chemical Co., Salina
Al Dougherty, Allied Pest Control, Wichita
W. J. Drexel, Andrews Exterminating Co., Wichita
T. S. McAnally, Andrews Exterminating Co., Independence
G. C. Elon Visetor, Andrews Exterminating Co., Kansas City, Mo.
G. H. Armstrong, National Termite Control, Inc., Wichita
F. R. Andrews, Andrews Exterminating Co., Kansas City, Mo.
U. O. Hawks, Interstate Exterminating Co., Wichita
R. G. Yapp, Kansas Entomological Comm., Manhattan
Paul A. Dahm, Kansas State College, Manhattan
Ed Moorman, Underhill Exterminating Co., Manhattan
Bert Thomas, National Termite Control, Inc., Wichita
Fred M. Powell, Fred M. Powell Co., Topeka
Fred A. Moore, Moore Chemical Co., Dodge City
R. S. Darbe, Darbe Termite Control, Independence
Virginia Preuitt, Darbe Termite Control, Independence
J. V. Wolf, Darbe Termite Control, Independence
Everett Starne, Attica Termite Control, Attica
Robert R. Schendel, Schendel Pest Control, Topeka
R. W. Hart, R. W. Hart Co., Topeka
H. L. Davids, Underhill Exterminating Co., Wichita

Next regular meeting of this newly formed association will be held at Fairchild Hall, Manhattan, Kansas, 10 A. M., July 20th. All operators in the vicinity are invited to attend. Non-members interested in joining should write to the association at 2341 N. Broadway, Wichita, Kans.

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Florida PCA Meet

(from page 44)

a word of welcome: D. C. Thurman, S. A. Sanitarian, USPHS, Jacksonville, spoke next on the "Biology and Control of the Brown Dog Tick." Doyle J. Taylor, Entomologist, USPHS, Gainesville, followed with a report on Florida tick surveys and the relation of ticks to Rocky Mountain Spotted Fever. "Parathion, Possible Uses on Citrus and Ornamentals," was the subject of J. T. Griffiths' discussion with the morning group. Griffiths is an entomologist with the Citrus Experiment Station in Orlando. William P. Hunter, Rohm and Haas Chemical Co., Gainesville, then talked on "Unexpected Troubles in Field Entomology." This paper reading session was closed with a paper on "Insect Repellants," given by Fred A. Morton, Entomologist, Broward Exterminating and Supply Co., Ft. Lauderdale. His talk was illustrated with a 35mm. projector. The morning meeting closed with the preliminary business session of the Florida PCA over which President Roper presided.

Thursday afternoon's session started off with a report on the work of the Division of Entomology of the Florida State Board of Health given by John A. Mulrennan, Board's Director, Division of Entomology, Jacksonville. A symposium on Termite Control followed with E. M. Miller acting as leader. Miller, who is head of the Miami University Dept. of Zoology started the discussion with a talk on "The Habits of Florida Termites." Theodore Oser, Vice-President, Orkin Exterminating, Atlanta, Ga., followed with "The Characteristics of Chemicals Employed in Termite Control." John Roper, Miami, covered the methods of construction used in termite control. The picture, "Hidden Enemies." was shown next. After the picture, a tour of termite demonstration projects was made. First stop was at Prof. and Mrs. M. D. Cody's home and the second at the residence of Prof. and Mrs. Creighton. Each stop included an inspection of the premises and an open forum for discussion.

Thursday's activities closed with the Annual Banquet for structural PCOs, entomologists, their wives and friends held at the Primrose Grill.

Professor Creighton led Friday morning's symposium on insecticides and fumigants. He opened with a presentation of new developments in chemicals and aplication equipment. Walter Thames followed with a talk on the characteristics of fumigants used in structural pest control. Next on the program was James D. Rebstock, President, Florida Chemical Industries, Inc., Ocala, Fla., who spoke on the formulation of chemicals for use in structural pest control. Robert L. Peffly, Bureau of Entomology and Plant Quarantine, Orlando, discussed the comparative toxicity of four chlorinated compounds to mosquitoes. An open forum preceded the showing of a Kodachrome motion picture, "Better Livestock." This morning's program concluded with a symposium on Ethics in Advertising with Theodore Oser acting as leader. Members of the panel were Glenn H. Burnett, Getz Exterminators, Atlanta; William B. Sumner, Sumner Agency, Ocala; and Walter Helms.

Rodents and their control was the topic for discussion on Friday afternoon. A. J. Spencer, Gainesville, acted as chairman. Spencer, who represented the Fish and Wildlife Service, U. S. Dept. of Interior, Gainesville, led off with a report on the biology of rats occurring in domestic areas. Clyde D. Flynn, Rodent Control Specialist, Fish and Wildlife Service, USDI, Jacksonville, then spoke on the characteristics of the chemicals employed in modern rodent control. The formulation of these chemicals was discussed by T. Roy Young, Young-Jones Laboratories, Tampa. Bernard Kolkana, Orkin Exterminating Co., Miami, gave the principles of rat proofing. George S. Bote, Florida Board of Health, Jacksonville, then explained the relationship between the State Board of Health and rat control campaigns. After an open forum on rodent control the meeting moved to an area south of the college picnic grounds where an equipment demonstration was held. Demonstrations included the TIFA fog applicator, Bes-Kil Steam Generator, Speed Sprayer with supply unit, a Potts Spencer Portamist, a John Bean Spartan sprayer, a John Bean High Pressure Sprayer and a Hardie Trailer Hitch Sprayer with a Jeep.

At six p. m. that evening a delightful picnic supper was held on the college park picnic grounds for structural PCOs, entomologists, their wives and friends.

Saturday morning's discussions centered on the enforcement of the Florida Structural Pest Control Act with John A. Mulrennan of the State Board of Health, Jacksonville, acting as chairman. Rules and regulations under this act were presented by W. B. Gresham, Jr. also of the Board of Health, Jacksonville. The following men representing the Florida Structural Pest Control Board in the towns listed, participated in a panel discussion of the Act: Prof. John Creighton, Chairman, Gainesville; Andrew J. Rogers, Secretary, Gainesville; Fuller Tresca, Jacksonville; J. P. Walker, Or-

Va. PCA Organizes

Now the pest control operators in Virginia have formed their own association to add to the group of these organizations all over the country.

Recently 30 PCOs met in the Jefferson Hotel, Richmond, to form the Virginia Pest Control Association with Luther Church acting as temporary chairman. Bill Buettner, NPCA executive secretary, and NPCA past presidents, P. Calvert Cissel and Theodore Oser also attended to add their support. By-Laws and Constitution were adopted at this first meeting and the following were elected to office until January, 1949: President, Luther Church, Getem Mfg. Co., Norfolk; Vice-President, Henry Cowardin, Terminix Engineers, Richmond and Secretary-Treasurer, Charles E. Gerhardt, Orkin Exterminating Co., Roanoke. Henry Glasgow, Roanoke Exterminating Co., Salem, and L. I. Smiley, Foursquare Co., Richmond were appointed directors of the association.

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lando; John Roper, Miami; and William Gresham from the State Board of Health. The Conference was then adjourned. A short business meeting of the Florida PCA, at which the election of officers ocurred, concluded the activities.

In addition to a great number of entomologists attending this meeting, the following PCOs thruout the State of Florida attended:

P. F. Flaig, Naval Chemical Co., Panama City
Earl Whitford, Apex Pest Control Service, Miami
Riley Prince, A. A. Exterminating Co., Miami
B. J. Walker, Walker Chemical Co., Orlando
J. Y. Rudler, Rudler Exterminating Co., Orlando
Ralph Burns, Rudler Exterminating Co., Orlando
John Paul Jones, John Paul Jones Exterminator, Pensacola
J. P. Walker, Walker Chemical Co., Orlando
H. E. Johnson, Ancient City Termite Co., St. Augustine
E. F. Johnson, Johnson Termite Control, Savannah, Ga.
Truly Nolen, Economy Exterminators, Miami
Myron Milligan, Orkin Exterminating Co., Orlando
Sam Walkup, Jr., Irkin Exterminating Co., Tallahassee
H. O. Earnest, Teminix Service, Miami
W. A. Snare, Biscayne Exterminating Service, Miami
H. F. Wilson, D-W Chemical Company, Jacksonville
Theodore Oser, Orkin Exterminating Co., Atlanta
O. P. Brink, Orkin Exterminating Co., West Palm Beach
Clifford I. Green, Orkin Exterminating Co., Tampa
Bernard Kolkana, Orkin Exterminating Co., Miami
Newton Weiss, Southern Lab., St. Petersburg
W. G. Haile, Jr., Orkin Exterminating o., Orlando
Peter Clements, Clements Service, Ft. Lauderdale
Walter A. Helms, Orkin Exterminating Co., Jacksonville
Fred Morton, Broward Exterminating Co., Ft. Lauderdale
T. Roy Young, Jr., Young-Jones Lab., Tampa
G. M. Holder, Palm Beach Exterminating Co., West Palm Beach
Max Lipsey, Fog, Inc., Tallahassee
Arthur Myers, Florida Pest Control Service, Lakeland
J. M. Roper, Pan-American Exterminating Co., Mimai
William B. Sumner, Sumner Agency, Ocala
See-Jay Ext. Service, O. B. Griggs, New Orleans, La.
W. J. Horton, City Pest Control Co., Jacksonville
E. C. Long, Chapman Chemical Ca., Jacksonville
K. W. Young, Sta-Kil Chemical Co., Daytona Beach
D. R. Barnhart, D. R. Barnhart Co., Daytona Beach
J. R. Holiday, Speed Sprayer Equip. Co., Orlando
Charlie Remington, Westvaco Chemical Co., Orlando
S. A. Sossamon, Terminix Co., Tampa
John A. Mulrennan, State Board of Health, Jacksonville
Jack Nolen, Economy Exterminators, Ft. Lauder'ale
Tommy Travis, Home Ground Service, Leesburg
William G. Waldron, Waldron Exterminating Service, Ft. Pierce
William Gresham, Florida State Board of Health, Jacksonville
Dr. John T. Creighton, University of Florida, Gainesville

2, 4-D Weed Killer Must Bear Adequate Warning

Statement from Arkansas State Plant Board, Little Rock

Weed killers containing 2,4-D, when sold in Arkansas, must hereafter be labeled with adequate warnings against the damage which they may cause to crop plants. 2,4-D products which are found on sale in Arkansas without adequate warnings on the labels will be seized by the Plant Board under the provisions of Act 171 of 1947, and, in addition, the seller may be prosecuted.

Last year much damage was caused to cotton and other broadleafed plants by the drift of 2,4-D dust and sprays when applied by airplane to rice fields for the purpose of killing rice weeds, and several damage suits are now pending, and trouble is anticipated again this year. The fact that the warning given by the manufacturers on the labels of the 2,4-D preparations have in general been grossly inadequate has no doubt contributed to the difficulty.

In a recent statement, the U. S. Department of Agriculture recommends that the following warnings be used on the labels:

(1) For agricultural dusts containing 2,4-D acid or its salts or esters: "*Caution:* Before using, consult agricultural authorities in your state. This dust may drift for miles even on quiet days, and cause damage to susceptible plants such as cotton, beans, peas, etc. Use only where there is no hazard of drift. Do not store near fertilizers, seeds, insecticides or fungicides. After use of this dust, do not use same equipment for insecticides or fungicides (or give directions for cleaning the equipment)."

(2) For agricultural sprays containing 2,4-D acid or its salts or esters: "*Caution:* Avoid spray drift to susceptible plants, as this product may injure cotton, beans, peas, ornamentals, etc. (Coarse sprays are less likely to drift.) Thoroughly clean the spray equipment with a suitable chemical cleaner before using for other purposes (or, do not use same spray equipment for other purposes). Do not store near fertilizers, seeds, insecticides, or fungicides."

(3) In addtion to the above cautions, preparations containing esters should bear a warning against the hazards due to their vapors, such as: "Vapors from ble plants in the immediate vicinthis product may injure susceptity."

Manufacturers who now have 2,4-D in the hands of Arkansas dealers, if the warning on such products is not substantially equal to the "cautions" recommended by the U.S.D.A., should either recall the product, or send new labels to be used on it.

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Order Insecticides Early

(from page 34)

Following is the supply situation for some of the most commonly used insecticides, as reported by the Bureau of Entomology and Plant Quarantine and the Office of Domestic Commerce, U. S. Department of Commerce:

DDT — Plentiful supply, in all forms.

Pyrethrum — Adequate supply.

Rotenone — Plentiful now. May be late-season shortages since further imports may arrive too late to meet fully the period of peak demand.

Calcium Arsenate — Inventories are low but no shortage is anticipated because of the expected use of DDT and benezne hexachloride to replace part of the usual demand in protecting cotton.

Lead Arsenate — Supply probably adequate, although output not expected to exceed that of 1947.

Benzene hexachloride — This is one of the newer insecticides and it is reported in good demand. While current requirements are being met, supplies are not excessive and the situation may become somewhat tighter later in the season. Present indications are for wide use on the cotton crop.

Nicotine compounds — Somewhat more favorable than for the 1947 season, but likely to continue below demand this year. New phosphatic insecticides will replace nicotine to some extent.

It is anticipated that some of the newer insecticides, such as chlordane and chlorinated camphene, as well as insecticides containing fluorine, sodium fluosilicate, and sodium fluoride, will be in ample supply this year. Basic materials are available in quantities to meet the needs, and the manufacturers have facilities for producing, marketing, and distributing virtually all the material that will be required.

CORRECTION

On page 14 in the Purdue Conference story appearing in our May issue, Bill Brehem was inadvertently listed as Bill Graham. Albert Buck's name was misspelled as Albert Buckle. On page 12. the Research Fund total should have been reported at $2,145.53, ann additional $400 having been added at the Conference.

PESTALES

Charles D. Cushing of Vogel-Ritt, Philadelphia reports that on Sunday night, May 9th, a member of Rutgers University fraternity appeared on the radio show, "Strike it Rich," sponsored by Fifth Avenue Candy Bars. The student said the reason he wanted to win a large sum of money was that life was becoming too wild at the Fraternity house. When asked to explain, he said that the wild life consisted of rats in the basement, bats in the belfry and termites. The best estimate he had received so far for exterminating work was $150. He won the money.

* * * *

Bill Phippard from Cincinnati sent in a newspaper clipping from the *Cincinnati Enquirer* which read in part:

Wasps Burn Him Up, So He Gets Blowtorch

Wasps nesting in the eaves of his home bothered Basil D. Scharfe so he obtained a blow torch, climbed into his attic and started to burn them out. Scharfe almost got rid of his home, too. The eaves caught fire and firemen were summoned. When the blaze finally was controlled, after a four-hour struggle, holes had been chopped in three-quarters of the roof, and a total damage was estimated at $4,000.

* * * *

Bill Buettner picked this one out of a New York newspaper:

Firehouse Rat Slides Like Any Smoke Eater

Keene, N. H. — A large rat which inhabits the Keene fire station has won the respect of the city's fire fighters. The rat, they say, has several times been seen sliding down a water pipe between the first floor and basement, as smartly as a smoke-eater ever descended a pole.

* * * *

Catty

In Corcoran, California, a mill owner underestimated the power of the press. He found that rats were overrunning his mill and issued a plea through San Joaquin Valley reporters for cats. Soon he had received over 30 cats. A second plea "no more cats, please" was issued in a hurry.

* * * *

In London a shilling a week is provided to feed cats which catch rodents in British Government offices.

* * * *

There Must Be A Better Way

A Fort Wayne, Indiana, man was wounded in his right foot when his wife aimed at a rat with a shotgun and missed.

A Chicago man told police he grabbed a revolver when he saw a "big nasty" rat caught in a trap he had set in the rear of his restaurant. He fired, sending both rat and trap spinning into the air. They came down on the hammer of his gun, firing the weapon again and wounding him in the hand.

* * * *

He'll Chase Rats, Too

Robert D. Treat, in addition to being Springfield, N. J.'s secretary of the Board of Health, township clerk, registrar of vital statistics, secretary of Board of Adjustment and sanitary inspector, is also the town's ratarian. Wonder what he does in his spare time.

* * * *

Antsy Pants

To prove the public is becoming more "pest" minded, there is a recent advertisement in a Chicago paper offering attractive "antsy pants." These new broadcloth shorts for men are white with red, blue and tan ants printed on them. John T. Shayne, Michigan Ave. at Randolph in Chicago has them for $2.50 each. They're the boxer type. What next?

How to Remove Bees

(from page 14)

but when not available they may find a cavity in the walls, eaves or attic of homes or even in chimneys in which they may take up their abode. When this occurs they are almost certain sooner or later to cause annoyance and make it necessary that they be removed or destroyed.

When they select a convenient spot in the wall of a frame building or in the ceiling of a porch or even under the attic floor it is not too difficult to open up the space and remove the colony and combs. An interested beekeeper will frequently be glad to help remove such a colony just to get the bees. Also such a colony can be trapped out without opening up the space though that takes time. On the other hand, when a colony is once established in a chimney or in the wall of a house immediately behind an outside chimney then it is next to impossible to remove them and save the colony and any honey they may have stored.

When it is not possible to reach and remove a colony without too much damage to the building your best procedure is to destroy the colony and thoroughly close up all their entrances to prevent another swarm from moving in later. To destroy such a colony you can use a 5% or a 10% DDT or chlordane dust applied liberally into the entrance by means of an ordinary hand garden duster. Where it is possible to drive the dust directly in among the combs usually two or three applications at weekly intervals will promptly destroy the colony. On the other hand, when the poison dust cannot be driven in among the combs it may require several treatments to destroy the colony. The dust applied in the entrance, in such cases, will kill only the field workers as they come in contact with it as they go or come. This naturally weakens the colony but the queen and nurse bees continue to escape contact with the poison and continue to rear more workers. However, usually after a few heavy dustings have been made the colony will rapidly weaken and eventually "give up the ghost." Generally dust applications will carry back into cavities better than spray applications of the above insecticides both of which you pest control men are now using regularly. In my own experience chlordane has given faster results than DDT.

Newer Insecticides

(from page 28)

per 100 grams (150 mg. per kg.). It would seem, therefore, that during the winter months, Antu is not a satisfactory rat poison. No doubt, further information on the matter will be forthcoming.

That success in rat control does not depend on using exceedingly poisonous substances was demonstrated on a large scale in the United Kingdom during the war. An interesting account on this subject was recently published by Anthony Barnett[4] under the title "The War Against Rodents," which is well worth studying. In it are reported in popular language the results of research by the Bureau of Animal Population, Oxford, on the problems of rodent control, and the successful application of control methods based on scientific investigation.

It was found that by prebaiting with the bait base for four or five nights in succession at definite baiting points and then distributing the same bait with poison, the rats' shyness was overcome and they would make a full meal of the poisoned bait; kills of 85 to 100 per cent usually being obtained.

The extensive application of this prebaiting procedure, using only zinc phosphide, arsenious oxide, barium carbonate, and red squill, was the basis of successful rat destruction in Britain during the war. In December, 1943, nearly 40,000 manholes in about 3,700 miles of sewer in the London County Council area alone were baited in this manner and large sections completely cleared of rats. The Ministry of Food also was successful in disinfesting reserve food stocks of rats, so that by the middle of 1944 rats were rare in the Ministry's food depots.

The National Film Board has under preparation a new 35 mm. film dealing with rats and their control, sponsored by the Department of National Health and Welfare. It may bear the title "Rats — Man's Enemy," but at the time of writing, this has not yet been definitely decided upon.

4. New Biology 2, pp. 9-29, Penguin Books: London & New York, 1947.

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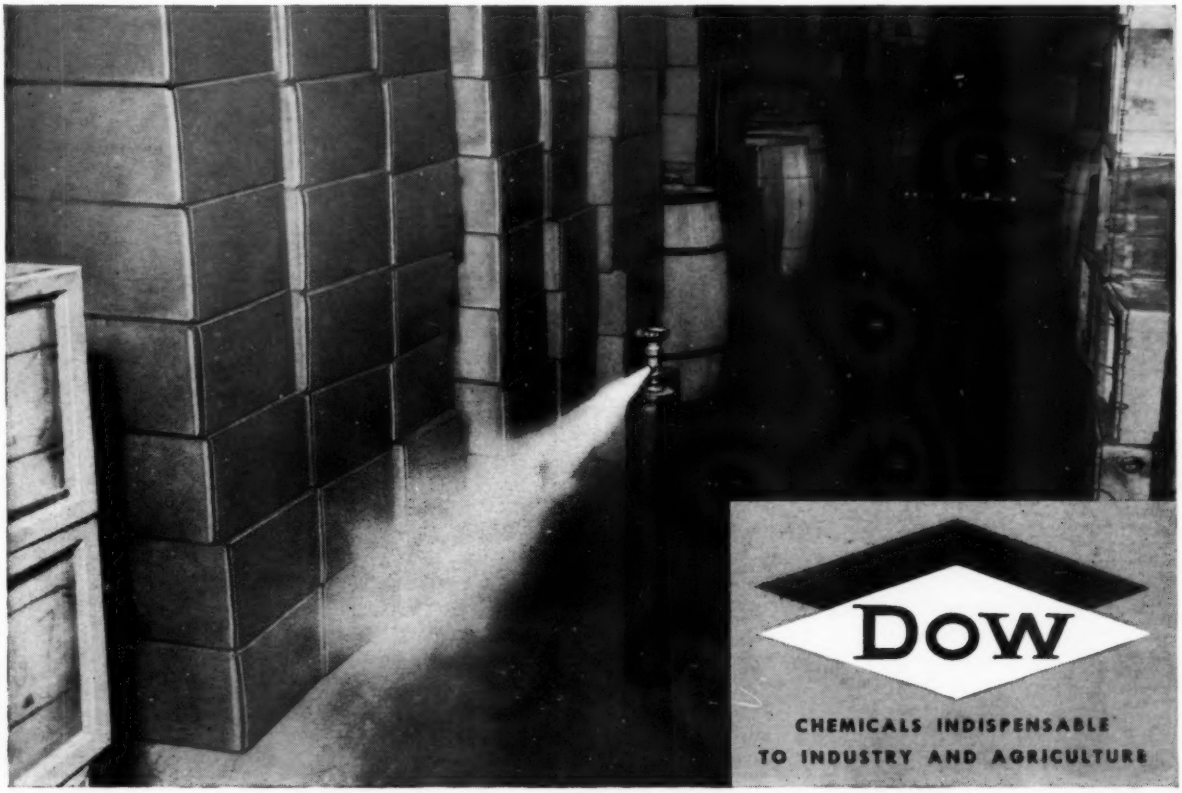

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